See Article on "Theory and Operation of Electric Braking."

COAL AGE

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COAL AGE

The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Not a Strange Decision

REFUSAL by the Interstate Commerce Commission of permission to the Virginian Railway Co. to extend its line across the Guyan River in West Virginia to serve a projected new mine of the Pocahontas Coal Co. throws into the spotlight the question of overdevelopment of the bituminous-coal industry. The transportation Act of 1920 conferred on the commission the power and responsibility of granting or refusing the right to build new railroads or extend old ones, having due regard to present and future public necessity and convenience. In this decision the commission is plainly acting within its powers and is doing that which the law anticipated and provided.

The commission found that the Virginian has not been able to give the full measure of service to the coal mines already on its lines and that the addition of another, as would be permitted by the building of this extension, would not increase the supply of coal produced and carried to market, that it would in fact serve only to dilute the service now possible to mines already existent. Unless the carrier should subsequently add materially to its road equipment, it would decrease rather than increase its revenues by reason of having this new mine to serve. The coal company alone stood to benefit.

Even if the carrier should increase its facilities and thereby make it possible for the new mine to market more coal, the necessity does not exist, in the opinion of the commission, for it says: "There are at present more mines in the country than is consistent with the most efficient use of carriers' equipment, and their aggregate capacity exceeds greatly the country's demand." Thus it appears that the refusal is predicated on two points, one the present fact of more mines on the Virginian than that road may adequately serve and the other that whether or not that be true, there are already too many soft-coal mines in the country for the carriers as a whole to serve properly.

On the second point the commission is not on sound ground; the premise is too general. The general condition of overdevelopment of the bituminous-coal industry cannot reasonably be held to prejudice a local situation. It is easily conceivable that public necessity and convenience might dictate the advisability of further mine development in a particular location. What would have been the decision of the Interstate Commerce Commission in this instance had the coal company shown that it could market the additional coal and the railroad that it could carry it to market? Would the fact that, the country taken as a whole—the Southwest, Illinois, other parts of West Virginia included—there is more mine capacity than is required or than can be served by present railroads have been a reason for denying this extension?

This is the first effective check on development of soft-coal mines. The railroads point out that for many years they have been obliged to meet every request of this character to avoid discrimination. The Railroad Administration would not permit the Fuel Administration to withhold sidings from new mines. Coal companies, as in this instance, find it better business to bring undeveloped reserves into production than to carry them as overhead. There has developed in recent years an insistent opinion that some way must be found to stay the endless opening of new soft-coal mines. Now that, some three years after its grant of power, the Interstate Commerce Commission has applied the designated remedy in a particular instance, it is well not to jump at conclusions as to the wisdom of the move. It is not, as characterized by the *New York Times*, "A Strange Decision."

This is, of course, regulation of the coal business and not so indirect at that. Its importance as respects coal may easily be over-emphasized—the real point on which a verdict is awaited is the apparent precedent set for all industry.

Lewis Against the Field

THE anthracite mine workers acceded to the request of the U. S. Coal Commission that the Tri-district convention in Scranton last week not bind its scale committee to hard and fast demands. This much favors a peaceful settlement. The scale committee will meet the operators at Atlantic City this week and in a few days is expected have before it the anthracite report of the Coal Commission. The cards will then be dealt and the game go on.

On the face of it the matter at issue is quite simple. The miners want more money for their work. They have framed their desires into some eleven "demands" starting off with 20-per cent increase in wage rates and winding up with many other demands, all calculated to increase their earnings. No one supposes for a moment that the operators will or can afford to grant such demands offhand. The customers of the coal companies do not like the price of coal as it is.

The mine workers will attempt to show that the operators should give them an increase out of profits, for the miners recognize the peculiar interest of the buying public in the price of their product. Following the precedent set by the soft-coal people last spring and under similar inspiration from the Coal Commission, the miners and operators might within a week easily reach an agreement to continue the present contract. This appears to be the logical outcome, whether it is reached in July or in September.

Matters are not so easily arranged in the hard-coal field, however, for the present International officers of the United Mine Workers "belong" less to this field than to the bituminous regions. The anthracite workers have the bit in their teeth and the matter from now forward will be more of a contest between the local anthracite leaders and the Lewis forces than one with the operators.

Dips Under Creeks and Streams

CONTRARY to Mr. Clevenberg's remarks in this issue, a general experience is that the coal under valleys is higher, not lower, than normal. Toward the outcrop, it is true, the coal tends to drop in a series of small faults, the throw of which does not exceed perhaps one to three inches, and is likely also to dip toward the face exposed by erosion, but where the seam passes under the valley no such slipping and miniature faulting can take place, and the coal tends to rise because the pressure of the hill causes the uncovered and unloaded measures in the valley to lift.

The clays tend to flow to the point of reduced pressure and there is some evidence that the coal also has flowed to that point, for it is often somewhat thicker in such places.

What Mr. Clevenberg remarks, however, is a different condition. He assumes that when the coal measures of the Carboniferous era were laid down, the peat was deposited over a slightly rolling surface and that these rolls are still visible as coal dips. It would be interesting to know if manifestations of the kind he describes have any uniform orientation. If they have not his surmise seems unanswerable.

If they have a sort of common direction, then they probably are due to mountain-making movements in little, occurring as they doubtless did occur in the Carboniferous era. The streams may have followed or may not have followed these movements of flexure, for if the latter were slow the streams would continue in their courses and would erode the intersecting flexures as they developed, as has happened monumentally in the Weber Canon in Utah. Mr. Clevenberg very plausibly suggests that as the dips follow the present streams, the original streams followed these dips.

In the Lower and Middle Kittanning beds of Pennsylvania there are well-marked dips running east and west which have neither relation to the topography nor to the mountain-making movements that occurred in the Permian and perhaps in the late Carboniferous era. But because the dips in these measures are so regularly oriented and are obviously different from Mr. Clevenberg's dips does not in any way disprove his theory of the origin of those dips which he describes.

Yet it is interesting to note that the "wants"—the ancient erosions and replacements—in these beds also ran in their main areas east and west, though it is true other erosions and replacements enter them often at right angles. These scars seem to have healed promptly in Pennsylvania. Nothing can be seen in upper beds of the dips that might have been expected to rise from them or from other origenic movements of like kind. Still at least one fairly large east and west erosion has been determined in the lower Freeport which tends to show that the origenic movements continued like in kind throughout the laying down of the Allegheny Series. What is stranger still is that the erosion in the lower Freeport is often lacking in the beds lower down. As against this theory is the fact that at least in some sections of Pennsylvania the dips running parallel to the so-called Permian uplift have thicker coal than the summits between them. This seems to suggest that a slight origenic movement, gentle but not unimportant, and similar to the larger movement in the Permian, occurred during the late Carboniferous period when the uppermost beds were being deposited.

The east and west erosion and dips and the thickening in northeast and southwest dips are contradictory and neither is so generally established as to justify dogmatism and to solve the question as to the line of folding during the deposition of the Allegheny series. Much of what happened during the laying down of that series is still a mystery and will remain so till the subject is carefully studied in the light of recent mine workings and levelings. Mr. Clevenberg, however, has added two interesting observations to aid us in our studies of the Carboniferous era and has offered a reason for them which is hard to gainsay.

The Indianapolis Indictments

BY THE manner in which he announced the unwillingness of the government to prosecute the Indianapolis indictment of the 226 coal operators and mine workers' officials charged with conspiracy under the Sherman law, Attorney General Daugherty added nothing of credit to his record. By a legal move he wiped the charges from the record of Judge Anderson's court and by a declamatory process he sets them up as his own. "In fact," he says, "I believe the acts committed were unlawful."

It has been the current opinion for some time that these defendants would never be brought to trial by the government and that the indictment probably would expire by the limitation of time. We are inclined to be of the opinion that it is Judge Anderson and not Mr. Daugherty who has had the wisdom and courage to *nolle prosse* it. It remains to inquire whether any good purpose was served by the proceeding and what significance attaches to Mr. Daugherty's threats that "We will get you again if you don't watch out."

The Attorney General said that the public is "fed up" with the idea that there is a "great and stubborn controversy" in the coal industry when in fact there is no controversy at all, that strikes are fake pretensions to alarm the public, under cover of which coal wages and prices are boosted. The facts are, we believe, just the opposite. Wage controversies in the coal industry are real but altogether too many people think they are staged, a belief fostered by these particular indictments and one which Mr. Daugherty is perpetuating. The overhanging threat of this case has greatly interfered with the proper course of wage negotiations in the past two years. The doubt thrown on the whole process of collective bargaining by the proceedings in Judge Anderson's court and the hesitation natural to those operators who were under this cloud in meeting in interstate conferences was a factor of no mean consequence in the strike of 1922.

Nor is the air cleared with the dismissal of the charge in respect to these 226 defendants. "It is essential to the prosperity of both employer and employee," the Attorney General is quoted as having said, "that proper agreements be entered into, and the government is not concerned whether the agreements are made collectively or individually if the things agreed upon are lawful." The general tenor of his remarks to the court are to the effect that these people did a lot of unlawful things but because they would be able to convince a jury of their good intent and the participation of a previous administration in their activities, they could not be convicted. But, if they do unlawful things again, he will get after them.

What is unlawful in the premises?

Carbon Dioxide Succeeds in Fighting Bitner Mine Fire When the Flooding of the Workings Fails*

When Fire Dies, Mine Atmosphere Contracts and Sucks in Air Unless Given Carbon Dioxide which Cools Mine, and Saves Fire from Necessity of Generating Its Own Inert Gas

BY CHARLES L. JONES†

MUCH interest should be manifested by coal operators and the state mine departments in the successful way in which the fire in the Bitner mine, of the H. C. Frick Coke Co., was extinguished with the aid of liquefied carbon dioxide. This mine, which is located in the coke region of Pennsylvania, caught fire on the night of Nov. 16, 1922. Prior to the adoption of the unusual method about to be described an attempt was made to fight the fire by flooding, but because flooding failed to stem the spread of the fire, which by Dec. 16 had extended over an area of approximately 13 acres, the management decided to use liquefied carbon dioxide for subduing the conflagration.

From Dec. 16 to Dec. 25 large quantities of this inert gas were administered to the affected workings, after which period the quantities introduced were considerably reduced. It should be mentioned here, however, that the application of water was continued; thus the temperature was lowered without for a moment allowing the atmosphere surrounding the fire to become of a character that would support combustion. Aside from its efficiency in the fighting of mine fires, carbon dioxide appeals by virtue of its low cost and its ease of administration.

Carbon dioxide has been suggested on several occasions in the past as an agent for fighting mine fires, and in a few cases trial has been made of its value. The attempts have met with all degrees of success from complete effectiveness to entire failure, depending upon conditions. However, the relative costs of different sources of inert gas, the quantities necessary to insure success and the technique of inert-gas application have never been definitely determined in such a way as to encourage conservative mining engineers in making any general application of the method, although the theoretical supremacy of inert gas as a fire-extinction medium has been generally taken for granted.

As typical of the attitude of mining engineers and operators may be cited the attitude of state mine inspectors. After two months of gas application at Bitner had given good indications of success, I addressed a letter to each of the state mine inspectors listed in *Mineral Industry*, stating that certain practical information on the inert-gas method of extinguishing mine fires had been developed, and inquiring as to the number of fires occurring in the various states during the last three years.

Nineteen answers were received, mentioning specifically thirty-nine fires, of which twenty-two were in coal mines. Two states apparently had no fires. Nine replies showed that an effort was being made to keep a record of fires in the states, while ten showed no such effort. One letter expressed doubt as to the efficacy of the inert-gas method, two expressed interest in any information that might be forthcoming, and fourteen showed no interest whatever in carbon dioxide as an agent in fighting mine fires.

Successful applications of the inert-gas method as long ago as 1851, at Clackmannan, Scotland, have been related by Walker.[1] The use of liquefied carbon dioxide as a fire-extinction agent seems to have been first suggested by Barber,[2] and Spencer[3] has described the successful application of liquefied carbon dioxide to a small mine fire.

*Paper read before West Virginia Coal Mining Institute, at Clarksburg, W. Va., June 19.

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[1] *Mines and Minerals*, June 1908, 505.
[2] *American Chemist*, 5 (1875), 395.
[3] *Trans. Inst. Min. Eng.*, 17 (1900), 181.

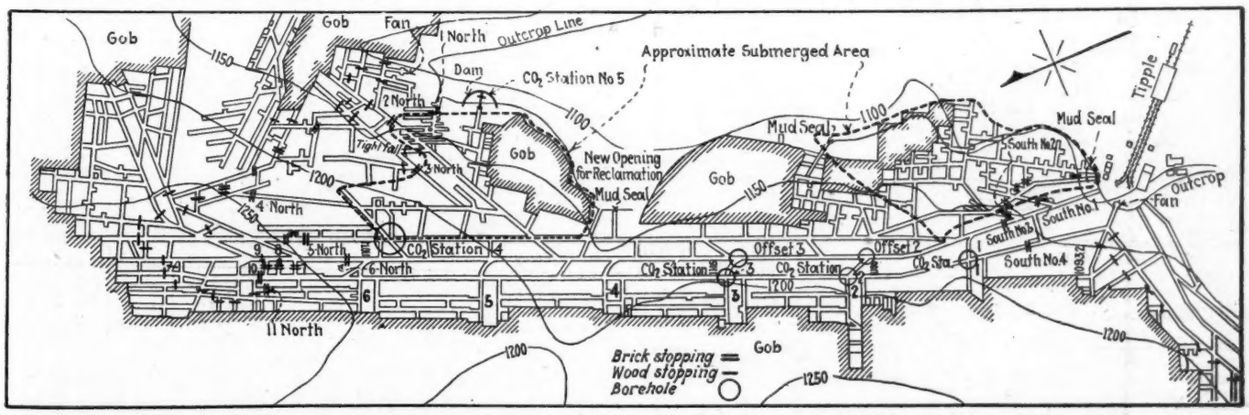


FIG. 1—PLAN OF BITNER MINE SHOWING SEALS AND POINTS AT WHICH CARBON DIOXIDE WAS ADMITTED

The outcrop line on this map apparently was drawn before the coal was extracted and crosses the coal area in places. The coal, however, crops along much of the upper or roughly the eastern line of the illustration. The coal in the lower left-hand corner has about 150 ft. of cover but the cover is less over the rest of the area and in many places is only about 50 ft. thick, as can be noted by the contour lines. The weak spots were in the caved rooms near the crop, but water had been run into two-thirds of these reducing the hazard that air might enter and restore the activity of the smoldering fire.

Evans[4] has told of a fire at Senghenydd colliery in the autumn of 1913, which was treated for several weeks with insufficient quantities of carbon dioxide manufactured on the spot from sodium bicarbonate and sulphuric acid. Even in this case, although water and perseverance finally put out the fire, it is believed that the carbon dioxide rendered valuable assistance in lowering the temperature, minimizing changes in pressure and preventing fresh air being drawn in to the fire area. This last action of drawing in air when cooling and driving it out as the temperature rises is known as the "breathing effect."

On the other hand, it is recorded in scientific literature that carbon dioxide has been employed unsuccessfully in several cases; for example, in the metal mines of the United Verde Copper Co.[5] However, fires in metal mines occur under conditions vastly different from those in coal mines, particularly with respect to the ratio of combustible material to oxygen supply, consequently the two classes of mine fires cannot be treated in at all the same manner by the inert-gas method. The compressed-air method finally adopted by the copper company mentioned would have played havoc in a coal-mine fire.

Unfortunately, negative results are not often published, and there must be some cases in which the inert-gas method has failed in coal mines, just as there are buildings burned to the ground in spite of modern fire apparatus. In each case a number of variables determine the success or failure of the treatment, but the fireman at a burning building must use his judgment unaided by any accurate means of determining conditions he cannot see, while the mine fire can be literally "chemically controlled."

The various agencies which may give rise to mine fires have been discussed at length in the literature[6] and need not be referred to here. It seems that the progress of an imperfectly sealed mine fire has never been followed carefully, either under inert-gas treatment or otherwise, by an adequately large number of systematic gas analyses at various points, as well as by close daily observation of temperatures, pressures, etc., at various parts of the affected area. I was, therefore, glad to have an opportunity to make a complete study of the Bitner fire and to follow up the application of liquefied carbon dioxide to it.

Between fifty and sixty million pounds of liquefied carbon dioxide are produced annually in the United States. Small quantities are obtained from magnesite, from fermentation and from natural mineral springs, but the bulk of it—in fact over 90 per cent—is manufactured by the combustion of coke. High-grade coke is burned under specially constructed boilers, with carefully regulated draft, producing flue gases with 17 to 19 per cent of carbon dioxide. The flue gases are scrubbed to remove dirt and sulphur compounds, and the carbon dioxide is then absorbed in a solution of sodium or potassium carbonate, from which it is boiled out prac-

[4] *Colliery Guardian*, March 7 (1916), 505.
[5] *Bull. Am. Inst. Min. Eng.*, 55 (1916), 186.
[6] G. A. Burrell, I. W. Robertson and G. S. Oberfell, "Black Damp in Mines," Bureau of Mines, Bull. 105.

Table I—Analyses of Gases, Temperatures and

South No. 2	December											
	20 11 A.M.	21 11 A.M.	21 3 P.M.	22 9 A.M.	23 9 A.M.	24 7 A.M.	24 4 P.M.	25 10 A.M.	26 10 A.M.	27 10 A.M.	27 4 P.M.	28 10 A.M.
Carbon Dioxide	10.2	15.0	15.4	15.4	15.2	13.7	19.3	19.9	20.0	17.2	17.6	16.5
Oxygen	5.1	1.6	1.6	2.5	3.5	6.5	0.7	0.7	0.8	2.9	2.4	1.5
Carbon Monoxide	0.6	0.7	1.0	1.0	0.8	0.6	1.1	0.8	1.0	0.8	0.9	0.6
Methane	1.5	1.8	1.8	1.8	1.7	1.4	1.9	1.9	1.9	1.7	1.7	1.9
Nitrogen	82.6	80.9	80.2	79.3	78.8	77.8	77.0	76.7	76.3	77.4	77.2	79.5
Air	24.5	7.7	7.7	12.0	16.8	31.2	3.4	3.4	3.8	13.9	11.5	7.2
Firedamp	2.1	2.5	2.8	2.8	2.5	2.0	3.0	2.7	2.9	2.5	2.6	2.5
Blackdamp	73.4	89.8	89.5	85.2	80.7	66.8	93.6	93.9	93.3	83.6	85.9	90.3
CO_2 in Blackdamp	13.9	16.7	17.2	18.1	18.8	20.5	20.6	21.2	21.4	20.5	20.5	18.2
N_2 in Blackdamp	86.1	83.3	82.8	81.9	81.2	79.5	79.4	78.8	78.6	79.5	79.5	81.8
Temperature	....	....	....	....	....	....	....	....	....	....	....	....
Pressure	....	....	—0.020	—0.024	....	—0.010	.....	.....	—0.015	+0.008	.....	.....

South No. 4	December																	
	19 10 A.M.	17 J.B.C.	20 11 A.M.	21 11 A.M.	21 3 P.M.	22 9 A.M.	22 4 P.M.	23 9 A.M.	24 7 A.M.	24 11 A.M.	24 4 P.M.	2 10 A.M.	26 10 A.M.	7 10 A.M.	27 1 P.M.	27 4 P.M.	28 10 A.M.	28 3 P.M.
Carbon Dioxide	4.7	5.2	6.9	9.8	11.5	8.8	13.3	12.2	9.8	10.6	15.7	6.4	6.5	5.4	19.2	15.9	3.8	6.6
Oxygen	12.6	10.4	11.6	8.1	6.9	11.0	6.9	8.0	10.0	10.2	5.3	14.6	14.1	14.6	1.1	4.0	15.8	13.4
Carbon Monoxide	....	1.6	0.7	1.0	1.9	0.8	1.6	1.1	1.1	1.4	1.8	0.6	0.4	0.1	1.7	1.6	0.5	0.5
Methane	0.8	1.0	0.9	1.2	1.3	0.9	1.3	1.2	1.0	1.0	1.5	0.6	0.6	0.6	1.9	1.6	0.5	0.7
Nitrogen	81.9	81.8	79.9	79.9	78.4	78.5	76.9	77.5	78.1	76.8	75.7	77.8	78.4	79.3	76.1	76.9	79.4	78.8
Air	60.5	50.0	55.6	38.9	33.1	52.8	33.1	38.4	48.0	49.0	25.4	70.1	67.7	70.1	52.8	19.2	75.9	64.4
Firedamp	0.8	2.6	1.6	2.2	3.2	1.7	2.9	2.3	2.1	2.4	3.3	1.2	1.0	0.7	3.6	3.2	1.0	1.2
Blackdamp	38.7	47.4	42.8	58.9	63.7	45.5	64.0	59.3	49.9	48.6	71.3	28.7	31.3	29.2	91.1	77.6	23.1	34.4
CO_2 in Blackdamp	12.1	11.0	16.1	16.6	18.0	19.3	20.8	20.6	19.6	21.8	22.0	22.3	20.8	18.5	21.0	20.5	16.4	19.2
N_2 in Blackdamp	87.9	89.0	83.9	83.4	82.0	80.7	79.2	79.4	80.4	78.2	78.0	77.7	79.2	81.5	79.0	79.5	83.6	80.8
Temperature	....	....	....	....	....	....	....	68	72	70	77	77	73	73	....	....	73	....
Pressure	....	....	....	—0.028	—0.016	—0.030	—0.019	....	—0.015	—0.007	....	....	—0.004	....	+0.005	....	—0.005	....

South No. 2	January																
	14 9 A.M.	15 1 P.M.	16 11 A.M.	17 11 A.M.	18 9 A.M.	19 9 A.M.	21 9 A.M.	22 5 P.M.	23 10 A.M.	24 11 A.M.	25 11 A.M.	27 5 A.M.	29 9 A.M.	31 9 A.M.	2 9 A.M.	4 6 A.M.
Carbon Dioxide	9.2	12.0	11.0	8.8	11.4	11.4	11.5	12.3	11.9	10.4	9.4	11.9	11.4	11.1	11.5	7.4
Oxygen	6.4	3.3	5.5	7.6	3.4	3.6	3.7	2.6	3.1	5.2	6.1	2.2	2.9	3.0	3.6	10.4
Carbon Monoxide	0.2	0.5	0.0	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.7	0.5	0.2	0.2	0.2	0.4
Methane	1.4	1.7	1.5	1.3	1.7	1.7	1.6	1.7	1.7	1.5	1.4	1.8	1.7	1.7	1.7	1.0
Nitrogen	82.8	82.5	82.0	82.2	83.5	83.2	83.1	83.3	83.1	82.7	82.4	83.6	83.8	84.0	83.0	80.8
Air	30.7	15.8	26.4	36.5	16.3	17.3	17.7	12.5	14.9	25.0	29.3	10.6	13.9	14.4	17.3	50.0
Firedamp	1.6	2.2	1.5	1.4	1.7	1.8	1.7	1.8	1.9	1.7	2.1	2.3	1.9	1.9	1.9	1.4
Blackdamp	67.7	82.0	72.1	62.1	82.0	80.9	80.6	85.7	83.2	73.3	68.6	87.1	84.2	83.7	80.8	48.6
CO_2 in Blackdamp	13.6	14.6	15.3	14.1	13.9	14.1	14.3	14.4	14.3	14.2	13.7	13.6	13.5	13.3	14.2	15.2
N_2 in Blackdamp	86.4	85.4	84.7	85.9	86.1	85.9	85.7	85.6	85.7	85.8	86.3	86.4	86.5	86.7	85.8	84.8
Temperature	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Pressure	—	+	—	.....	+0.01	+	+0.01	—0.01	+0.015	—	—	+	+	—	—	—

tically pure. Modern plants are balanced so that there is just enough steam produced from the combustion of the coke to operate the machinery and compress the carbon dioxide into cylinders.

Carbon dioxide is sold in cylinders of two standard sizes, of which the larger contains 50 lb. of gas, equivalent to 408 cu.ft., at 32 deg. F. and 760 mm. pressure, or about 450 cu.ft. under an average atmospheric temperature and pressure. This size of cylinder has an outer diameter of 8½ in. and is 51 in. high. It contains slightly over 150 lb. as an average when filled with gas. These cylinders are all built and tested under Interstate Commerce Commission regulations, and such has been the progress in manufacture and testing that accidents in handling these cylinders are almost unknown. All work in connection with the application of carbon dioxide to mine fires may be performed by common labor.

The turnover on cylinders in the carbon-dioxide industry is very slow, and, as the investment in containers is high, interest charges, depreciation and maintenance equal in aggregate the manufacturing cost. Hence the cost of the gas apparently is high, although it will be shown to compare favorably with other methods for the results obtained. As 90 per cent or more of the output of liquefied carbon dioxide is used in the soft-drink trade, the business is necessarily seasonal in nature, but stocks in most large cities are sufficient to assure an immediately available supply of gas at any mine located near a center of population.

The refrigerating effect of the gas expanding from the pressure in the cylinders deserves special mention. When the gas is discharged directly from the cylinders to the atmosphere or into a mine, this refrigerating effect is sufficient to reduce a part of the gas to the form of a snow, which has a temperature colder than 100 deg. F. The cooling effect of this snow in the mine is not as valuable as its action in excluding air from the fire, but it is important nevertheless. This cooling effect is not an unmixed blessing, however, for it occasionally stops up the cylinder valves with snow, thus retarding the discharge of gas. At the Bitner fire, therefore, the valves were kept thawed by means of torches when for a comparatively short time it was desired to obtain very high rates of gas input. Means have since been developed of avoiding this mechanical difficulty, without recourse to torches or to any other source of heat.

Carbon dioxide has been used successfully for fighting fires in other places than coal mines. One branch of the Bell system uses small cylinders of carbon dioxide for extinguishing fires in telephone switchboards, and for many years it has been used for smothering fires on shipboard. It is a method now well recognized by shipping experts and has the indorsement of the fire underwriters in Scandinavian countries. It has been more recently introduced on some American shipping with good results, and possesses many obvious advantages, especially in that it does not damage valuable cargo and in that it penetrates portions of the vessel which could not be reached with a hose.

One large American petroleum company owns tank

Pressures Observed at Two of the Seals in Bitner Mine

							January											
28 4 P.M.	29 9 A.M.	29 2 P.M.	29 3 P.M.	30 9 A.M.	30 4 P.M.	31 10A.M.	1 9 A.M.	2 9 A.M.	3 9 A.M.	4 9 A.M.	5 9 A.M.	6 2 P.M.	7 11A.M.	8 9 A.M.	9 5 P.M.	10 1 P.M	11 9 A.M.	12 11 A.M.	13 1 P.M.
17.2	14.6	13.0	15.2	15.1	10.2	15.0	12.9	14.4	14.2	13.8	12.0	13.3	11.2	9.7	10.6	10.6	11.3	11.5	9.4
1.0	2.6	4.6	1.8	1.7	7.4	1.2	3.4	0.8	0.5	1.2	3.2	1.1	4.3	5.9	4.3	4.6	4.7	2.7	6.1
0.5	1.4	0.5	0.5	0.8	0.6	1.1	0.3	1.6	0.7	1.4	0.6	0.6	0.3	0.2	0.3	0.1	0.2	0.6	0.3
1.9	1.7	1.6	1.8	1.8	1.3	1.9	1.7	1.9	2.0	1.9	1.7	1.9	1.6	1.4	1.6	1.6	1.5	1.7	1.4
79.4	79.7	80.3	80.7	80.6	80.5	80.8	81.7	81.3	82.6	81.7	82.5	83.1	82.6	82.8	83.2	83.1	82.3	83.5	82.8
4.8	12.5	22.1	8.7	8.2	35.5	5.8	16.3	3.9	2.4	5.8	15.4	5.3	20.7	28.3	20.7	22.1	22.6	13.0	29.3
2.4	3.1	2.1	2.3	2.6	1.9	3.0	2.0	3.5	2.7	3.3	2.3	2.5	1.9	1.6	1.9	1.7	1.7	2.3	1.7
92.8	84.4	75.8	89.0	89.2	62.6	91.2	81.7	92.6	94.9	90.9	82.3	92.2	77.4	70.1	77.4	76.2	75.7	84.7	69.0
18.5	17.3	17.2	17.1	16.9	16.3	16.4	15.8	15.6	15.0	15.2	14.6	14.4	14.5	13.8	13.7	13.9	14.9	13.6	13.6
81.5	82.7	82.8	82.9	83.1	83.7	83.6	84.2	84.4	85.0	84.8	85.4	85.6	85.5	86.2	86.3	86.1	85.1	86.4	86.4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	+0.017	+0.030	.....	.....	+0.015	—0.015	.....	+0.015	—0.005	+0.010	.....	.....	—0.010	.....	.....	.....	.....	.....	.....

							January											
29 9 A.M.	29 12 M.	29 2 P.M.	29 3 P.M.	30 9 A.M.	30 3 P.M.	31 10A.M.	1 A.M.	2 A.M.	3 A.M.	4 A.M.	5	6	7	8 9 A.M.	9 5 P.M.	10 1 P.M.	10 4 P.M.	11 9 A.M.	12 11 A.M.	13 1 P.M.
2.2	11.4	16.9	19.3	20.1	13.4	1.0	11.6	14.8	14.4	13.7	12.7	13.9	11.6	10.6	10.9	4.6	11.3	9.9	8.6	8.5
17.1	9.4	3.9	1.4	0.3	7.1	18.4	5.2	0.2	0.3	1.1	3.0	0.6	4.3	5.3	5.3	14.1	4.0	5.5	7.4	8.3
0.0	0.1	1.8	1.9	2.1	1.5	0.0	1.4	2.2	2.2	2.4	2.1	2.7	1.7	2.1	1.3	0.6	1.1	1.2	0.8	0.4
0.4	1.1	1.6	1.9	2.0	1.3	0.2	1.5	2.0	2.0	1.9	1.7	1.9	1.6	1.5	1.5	0.6	1.6	1.5	1.3	1.2
80.3	78.0	75.8	75.5	75.5	76.7	80.4	80.3	80.8	81.1	80.9	80.5	80.9	80.8	80.5	81.0	80.1	82.0	81.9	81.9	81.6
82.1	45.1	18.7	6.7	1.4	34.1	88.4	25.0	1.0	1.4	5.3	14.4	2.9	20.6	25.4	25.4	67.7	19.2	26.4	35.5	39.8
0.4	1.2	3.4	3.8	4.1	2.8	0.2	2.9	4.2	4.2	4.3	3.8	4.6	3.3	3.6	2.8	1.2	2.7	2.7	2.1	1.6
17.5	53.7	77.9	89.5	94.5	63.1	11.4	72.1	94.8	94.4	90.4	81.8	92.5	76.1	71.0	71.8	31.1	78.1	70.9	62.4	58.6
12.6	21.2	21.7	21.6	21.3	21.2	8.8	16.1	15.6	15.3	15.2	15.5	15.0	15.2	14.9	15.1	14.8	14.5	14.0	13.8	14.5
87.3	78.8	78.3	78.4	78.7	78.8	91.2	83.9	84.4	84.7	84.8	84.5	85.0	84.8	85.1	84.9	85.2	85.5	86.0	86.2	85.5
73			....	95	....	59	59	68	73	....	....	....	72	102	90	90	Wate	r up	to pip	e
—0.02	+0.085	+0.102	....	+0.070	+0.020	—.050	....	+0.025	+0.015	—0.005	.....	+0.010	+0.010	.....	.....	.....	.....	.....	.....	.....

February											March									
6 11 A.M.	8 9 A.M.	10 9 A.M.	12 9 A.M.	14 9 A.M.	16 9 A.M.	18 9 A.M.	20 9 A.M.	22 9 A.M.	24 9 A.M.	26 9 A.M.	1 9 A.M.	3 9 A.M.	5 9 A.M.	7 9 A.M.	9 9 A.M.	11 9 A.M.	13 9 A.M.	15 9 A.M.	17 9 A.M.	19 9 A.M.	21 9 A.M.
8.9	9.1	8.9	8.0	9.4	7.0	6.0	8.8	8.4	6.2	9.3	8.0	9.3	7.6	5.6	6.2	8.5	8.7	5.8	6.4	7.7	7.6
6.8	6.5	6.9	8.2	5.5	10.1	11.0	7.0	6.8	10.7	4.9	7.1	4.8	8.2	12.1	10.6	5.9	6.0	9.9	8.3	8.1	8.6
0.0	0.2	0.4	0.2	0.0	0.2	0.4	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.2
1.3	1.4	1.3	1.2	1.5	1.0	0.9	1.3	1.3	1.0	1.5	1.3	1.5	1.2	0.8	1.0	1.4	1.4	1.0	1.2	1.2	1.2
83.0	82.1	82.5	82.4	83.6	81.7	81.7	82.8	83.4	81.9	84.3	83.6	84.4	83.0	81.5	82.0	84.2	83.8	83.2	84.1	83.0	82.4
32.7	31.2	33.2	39.4	26.4	48.9	52.8	33.6	32.6	51.3	23.5	34.1	23.0	39.4	58.0	50.9	28.3	28.8	47.5	39.8	38.8	41.3
1.3	1.6	1.7	1.4	1.5	1.2	1.3	1.4	1.4	1.2	1.5	1.3	1.5	1.2	0.8	1.2	1.4	1.5	1.1	1.2	1.2	1.4
66.0	67.2	65.1	59.2	72.1	49.9	45.9	65.0	66.0	47.5	75.0	64.6	75.5	59.4	41.2	47.9	70.3	69.7	51.4	59.0	60.0	57.3
13.5	13.5	13.7	13.5	13.0	14.0	13.1	13.6	12.7	13.0	12.4	12.4	12.3	12.8	13.6	13.0	12.1	12.5	11.3	10.8	12.7	13.2
86.5	86.5	86.3	86.5	87.0	86.0	86.9	86.4	87.3	87.0	87.6	87.6	87.7	87.2	86.4	87.0	87.9	87.5	62.7	89.2	87.2	86.8
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
—	—	—	—	+	—	—	—	—	—	+	—	+	—	—	—	+	—	—	—	—	—

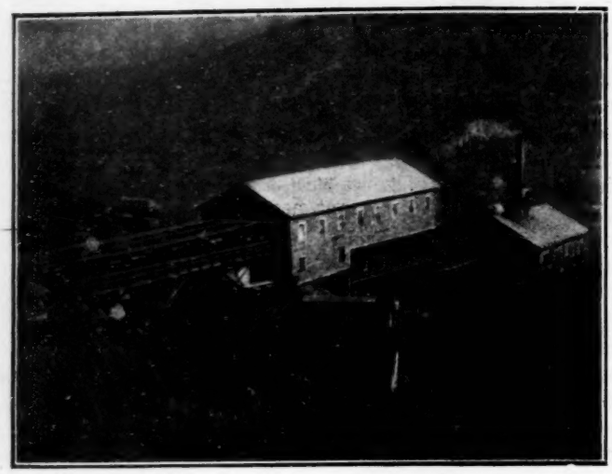


FIG. 2—TIPPLE, BITNER MINE

The Bitner tipple is quite close to the opening of the mine, as can be seen in the map. The easy hill slopes can be noted in the rear of this illustration.

ships provided with automatic appliances, thermostatically released, for discharging carbon dioxide into the vapor space of the oil tanks. Used in this way it makes a positively non-freezing and non-corrosive extinguisher. Two central-station companies have equipped turbo-generators with appliances for extinguishing fires with carbon dioxide.[7]

The principal function of carbon dioxide in fighting mine fires is not so much to extinguish fire *per se* as to prevent inward leakage of air, whether it occurs as compensating for fluctuations of barometric pressure or as the result of the cooling of the mine atmosphere.

To illustrate the latter point, consider an underground working which is comparatively tight, the fire in which could be extinguished easily by accepted methods of sealing off. If the fire is a hot one and occupies a large percentage of the sealed-off area, the average temperature in the fire area may easily reach 240 deg. F. In such a case the contraction in cooling to normal temperature would be about 25 per cent of the gas volume in the fire area. Assuming no leakage, this would mean a pressure difference across the brick stoppings of about 3.7 lb. per square inch, which, due to leakage, is never observed in practice. Obviously the answer is that leakage is important even in this case. It would be interesting to know how much more quickly such a sealed-off fire might be opened under inert-gas treatment than when sealed off without such treatment, especially where the fire area cuts off all access to important workings.

Another simple way of presenting this theory of mine-fire behavior is to consider the relation of the two heat quantities—namely the heat generated by combustion, and the heat dissipated. The heat dissipated may consist of heat removed by running water through the mine, heat conducted through adjoining strata, heat transferred by air currents from hotter to cooler parts of the mine and heat dissipated by direct ventilation of parts of the fire zone where the temperature is already relatively low and no combustion is taking place. It is difficult to treat the whole subject in any precise manner, as there are so many variables in each case, but some study will convince the reader that water is the agency with the greatest potentiality for rapid cooling in an emergency, assuming that conditions are not such as to generate large volumes of steam or water gas.

[7] *Electrical World*, 80 (1922), 165; idem, 80 (1922), 1089.

When these two heat quantities are approximately equal—the heat generated and the heat dissipated—the fire does not either grow or die down very rapidly, and we say that such a fire is smoldering. In fact smoldering is *prima facie* evidence that these two heat quantities are approximately equal. Now, relatively speaking, we have no control over the quantity of heat dissipated by conduction through the adjoining strata, although, to be sure, this varies with the temperature of the mine. We can, however, control the quantity of heat generated by controlling the inward leakage of air. It is obvious that when this leakage is decreased until the heat generated becomes less than the heat dissipated, the mine must cool and we are moving toward extinction of the fire. It would be desirable to avoid leakage altogether, but it should be noted that this is not necessary.

Carbon Dioxide Better than Sulphur Dioxide

Other inert gases have been proposed for fighting mine fires, namely, sulphur dioxide, nitrogen, and flue gases. Sulphur dioxide in its actual effect on fire has some advantages over carbon dioxide, in that it is heavier and is more effective in abstracting heat. Pure sulphur dioxide in liquid form is too expensive and not available in sufficiently large quantities to warrant consideration in most cases, and flue gases which can be made by burning sulphur under practical conditions still contain such large percentages of oxygen that they would be much less effective, for example, than a carefully produced flue gas from direct combustion of coal or coke. Furthermore, very small percentages of sulphur dioxide render atmospheres irrespirable, while men can tolerate without ill effects any percentage of carbon dioxide which will not extinguish a safety lamp, and in some cases even more.

Nitrogen is obtained in large quantities in the manufacture of oxygen by the liquid air process. The ratio of cylinder weight or shipping weight to the weight or volume of gas contained introduces high transportation charges, however, so that nitrogen need be considered only where the fire to be extinguished is close to the plant shipping the nitrogen. Further, carbon dioxide is more effective than nitrogen, at least for gaseous combustion.[8]

Flue gas is the only serious competitor of liquefied carbon dioxide for fighting mine fires and has been used successfully for the purpose. But it is not as effective

[8] J. K. Clement, "The Influence of Inert Gases on Gaseous Combustion," U. S. Bureau of Mines, Technical Paper 43.

FIG. 3—HAULING CYLINDERS BY TRACTOR TO STATION

This also gives an idea of the easy contours of this region.

FIG. 4—ONE OF THE CARBON-DIOXIDE STATIONS

Station No. 3. Nothing elaborate was needed. A simple canvas shelter served to protect the operations. A small stock of cylinders is lying on the outside of the station.

as carbon dioxide, it contains some oxygen, it is not as easily transported and distributed over large areas, and it requires for its preparation and application equipment which requires some time to assemble. The liquefied gas excels it in the following particulars:

(1) Liquefied carbon dioxide is 100 per cent effective. Flue gas is effective only in proportion to the oxygen which has been removed from it. Inexperienced help cannot prepare flue gas containing 19 per cent of carbon dioxide in any kind of improvised apparatus. The production of gas having that percentage of dioxide requires considerable care and close regulation of draft. The availability of comparatively large quantities of water for cooling the flue gas is an additional necessity. Though flame is extinguished by moderate percentages of carbon dioxide, incandescent carbon will continue to absorb oxygen until low percentages of residual oxygen are reached. The residual oxygen introduced with flue gases is, therefore, undesirable.

(2) Liquefied carbon dioxide in most cases is quickly available. The motor truck has placed most of the country's coal mines within a few hours of the nearest liquefied carbon-dioxide plant, and a minimum of special equipment is required for application of the gas. Flue-gas application requires time and trouble for the installation of special equipment.

(3) Liquefied carbon dioxide is portable. In the Bitner mine fire, gas was introduced through six stations or units, separated by considerable distances along a line over 2,000 ft. long. Once an entire station was moved to a new location where it appeared to be more effective. It would have been expensive and difficult to distribute flue gas in this manner from a centrally located boiler.

On the other hand, flue gas unquestionably is cheaper per cubic foot where it is to be used in sufficient quantities and over a long enough time to pay for the equipment that must be installed. I believe that flue gases and liquefied carbon dioxide have distinct and special fields, and that flue gases should be used wherever: (1) Plenty of time is available between the decision to apply the gas and its actual application. (2) Leakage is very great and it is evident that large volumes of inert gas will have to be applied over long periods of time in order to put out the fire. (3) The nature of the fire is such that portability is not a consideration.

The Bitner fire was discovered on the night of Nov. 16, and is supposed to have been caused by a grounded trolley. However, from its later behavior, it seems possible that more than one source of fire may have played a part. At any rate, the fire spread notwithstanding the best efforts of the fighters, until the length of the area actually on fire was 2,400 ft. At this point in its advance J. R. Campbell, chief chemist for the company, suggested that inert gas be considered. On Dec. 13 decision was made to try liquefied carbon dioxide, and by the afternoon of Dec. 16 1,440 50-lb. cylinders of carbon dioxide had been hauled over 60 miles by motor truck, a line of 25 brick-stoppings in the mine surrounding the fire area had been completed, some of the surface leaks caused by falls along the outcrop of the coal seam had been sealed, facilities had been provided for discharge of gas into the mine through three boreholes, and at 3 p.m. the first gas was discharged into the mine. Much better time might have been made had it not been necessary to plan and construct discharge facilities on the ground.

The drums were discharged into the mine through boreholes in units of five, each unit being housed separately in a temporary shelter with wooden roof and canvas or jute sides. On of these units is shown among the accompanying photographs. Before commencing to apply the gas, seven boreholes were drilled from the surface into the mine workings, and four of these holes were used for the introduction of gas. The casing in the boreholes was reduced to 2 in. at the top, and led to a manifold of 2-in. pipe with ½-in. branches.

Gate valves were provided in all units and branches, so that any drum or unit could be disconnected without permitting a back rush of gases from adjacent units or from the mine. Each drum was connected to the ½-in. type through a ½-in. sleeve and nipple of ordinary weight by means of a ground union. In general, the five drums of each unit were discharged all at once and changed on regular schedule, allowing from two to eight hours between changes. However, the schedules were laid out on a basis of the trend of gas analyses, pressures, and temperatures in the fire zone, and on occasion a drum was discharged completely in less than half an hour, while, on another, drums were changed only twice daily.

Each of the shelters was heated by a salamander which burned coke. No difficulty was experienced in discharging the gas, although torches had to be used to empty the cylinders completely when they were dis-

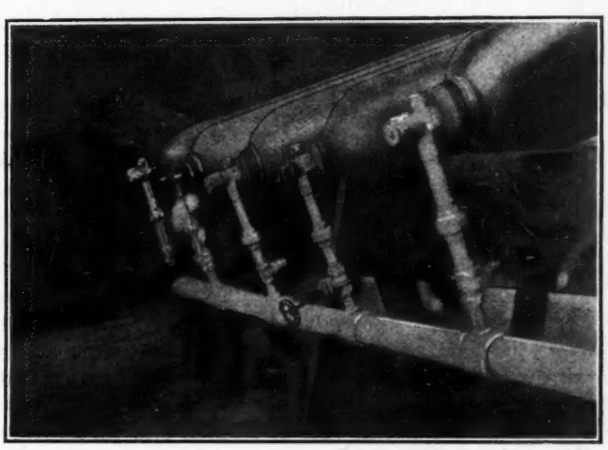


FIG. 5—RACK OF GAS CYLINDERS AND MANIFOLD

The discharge pipes of the gas cylinders are connected with a manifold through which the carbon dioxide passes to the borehole. The piping becomes frosted owing to the intensity of the cold generated by the evaporation of the carbon dioxide. The dioxide freezes at a temperature of 100 deg. below zero, F.

FIG. 6—BRICK STOPPING SHOWING METHOD OF TAKING GAS SAMPLES AND TEMPERATURE READINGS

An oak pole was used to pass the apparatus into the hole and pull it out again. All stoppings were patrolled at regular intervals and indications of each visit were marked on the wall of the stopping.

charged at the higher rates. Occasionally, after the mine had become comparatively cool, plugs of ice were formed in the boreholes from ground waters seeping through the earth below the bottom of the well casing and coming into contact with the cold carbon dioxide, but this ice melted when operations were temporarily suspended.

Gas samples were taken through ½-in. pipes cemented into the stoppings and through boreholes not used for gas input. Temperatures were taken by means of tapered hardwood poles about 4 ft. in length, made to enter and plug a 2-in. pipe through the stopping up to the last 6 in. of their length. They thus protruded inside the stopping some 30 in., and carried on the inner end a thermometer placed in a groove and fastened. These thermometers were left in position continuously, except when withdrawn for reading, and the error introduced by withdrawing them for this purpose is believed to have been small. Temperatures also were taken at the bottom of the boreholes by means of maximum-minimum thermometers. The locations at which these analyses and temperatures were taken may be identified on the map (Fig. 1).

It will be observed that the boreholes actually used for gas input have been numbered from south to north, and that the south stoppings and the north stoppings have been numbered separately. Although the total number of brick stoppings is twenty-five, the number of effective stoppings separating fire areas from respirable gases is fifteen, four on the south end and eleven on the north.

Pressures were measured only a part of the time and then by means of an Ellison draft gage. At other times they were noted simply as positive (outward) or negative (inward). Where fans were ventilating the area outside the stopping, the fan pressure must be added or subtracted from the observed differential pressure, in order to get the relation of the inside pressure to the atmospheric.

Gas samples were analyzed in a Burrel type Orsat apparatus lent by the Pittsburgh station of the U. S. Bureau of Mines, and acknowledgment should be made to D. K. Smith, who did much of the work. Analysis was made for oxygen, carbon dioxide and carbon monoxide. Occasional check analyses showed the methane to be about 2 per cent. Soon after the work of extinguishment commenced, decreasing to about 1 per cent before the mine was opened.

Hence, in interpreting the analyses, which often were of nine gases more or less diluted with air, the methane content was assumed to be 2 per cent of the combined firedamp and blackdamp, inasmuch as inleaking air, of course, carried no methane. The factor used in converting oxygen percentage to air was 4.3. Samples were taken daily, and oftener when necessary, until Jan. 25, and every other day thereafter.

Firedamp, which is held to include combustible gases, is taken as the sum of experimentally determined carbon monoxide and the assumed methane content. Blackdamp (constituents which will not burn or support combustion) is then 100 per cent less the sum of the air- and firedamp. The advantage of a calculation made on this basis, which will be obvious to most mining men, lies mainly in the direct indication of the percentage of air, which is an index of leakage. Furtherfore, by its means we are able to determine the quantity of carbon dioxide in the blackdamp, thus eliminating the confusing effect of leakage when interpreting the gas analysis in the light of the quantities of gas introduced.

The rate of gas input and its effect are shown in Fig. 7. It will be seen, gas input started Saturday afternoon, Dec. 16, and on Dec. 24 reached the maximum rate of 355 50-lb. cylinders of carbon dioxide in 24 hours, or 159,750 cu.ft. The greater part of the carbon dioxide —some 230,000 lb. was introduced in all—was administered during this period. On Dec. 25 and 27 the rate of delivering gas received its first decided cut.

Referring to Fig. 7 it will be noted that the percentage of carbon dioxide in the blackdamp commenced to decrease at this time, and continued a "long-swing" decrease throughout the rest of the work, except as brief increases were caused by the lowering of the barometer or by further changes in the rate of gas input. The suggestion that the leakage from the fire zone must have been between 80,000 and 150,000 cu.ft. per day under average conditions at once presents itself, but this does not follow directly, as the number and distribution of the points where gas samples are taken has a direct bearing on the average figures obtained.

The "average" is not a true figure expressing the average volume composition of the mine gases but only the arithmetical average of samples taken at accessible points. Table I gives records for reference, the com-

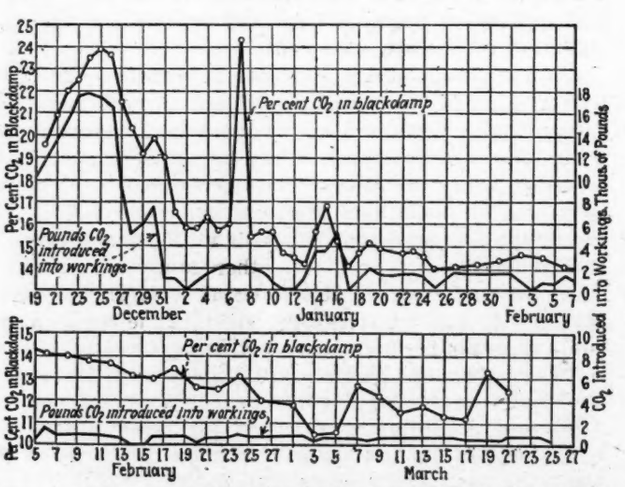


FIG. 7—DIOXIDE IN BLACKDAMP AND AS FED TO HOLES

The lower graph should be read as continuous with the upper graph. Note that the base line of what should be the right half is 10 and that of what should be the left half is 12. The figures of the blackdamp are average figures for all points of test over the entire field and the quantities of carbon dioxide also are totals for all the stations.

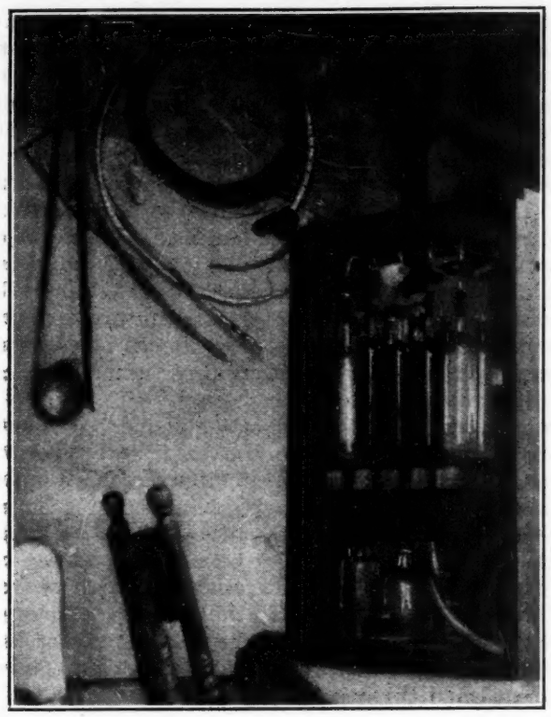


FIG. 8—"CHEMICAL LABORATORY," BITNER MINE

All that was needed was a portable Orsat apparatus of the Burrell type, a thermometer, a barometer and a pyrometer. This small outfit constitutes a complete laboratory for mine-fire control.

plete record of gas analysis for No. 2 and No. 4, both south, together with the values of temperature and pressure readings. An inspection of the volumes required to effect the changes in gas composition shown will confirm the statement that the mine is exceptionally leaky.

Throughout the operation gas analysis proved to be a most useful means of predicting changes and in controlling the gas input. Gas-analysis variations can be correlated consistently with barometric changes and the comparatively large quantity of gas taken up by the mine during the earlier stages without producing violent outward movement of gases can be explained only on the basis of rapid cooling. Unfortunately the temperature records are not as complete as might be desired, but this is not felt to detract much, as temperature data obtained at stoppings must be interpreted with the utmost caution. Every temperature reading so obtained is affected by the direction of the gas movement.

Perhaps the best example of this is at South Stopping No. 4, where the gas analysis was conspicuously unsatisfactory and for a larger percentage of the time than at any other point. This point was particularly sensitive to barometric changes, and the tendency toward inward movement of gases at this point seemed to be greater than at the other stoppings sampled. Temperature readings at this point were always satisfactory, fluctuating somewhat with outside temperature so long as air temperatures were taken inside the stopping and showed a steady cooling when the area immediately adjacent to the stopping was later flooded.

Several times during March it was reported that the gas analysis was such as to encourage fire in this local area, and on March 19 some increase in carbon-monoxide percentage at this point was noted. When the mine was finally opened a small hotbed of smoldering coke was discovered a short distance inside, which fortunately was so limited in extent as to be easily extinguished and loaded out. All temperatures recorded in this end of the mine were below 75 deg. F. before the mine was opened. Therefore, it is quite safe to say that gas analysis has proved itself capable of indicating conditions not recorded on a thermometer—at least when the thermometer is placed near a stopping and when the gas movement is inward.

A second excellent example of incorrect indications of temperature is in the increases noted at many points during December, when carbon dioxide was being introduced at the greatest rate and when the gas analysis indicated that no fire could exist in the sealed-off area.

This apparently puzzling phenomenon was caused merely by the establishment of a current of gas outward from hotter portions to the cool stoppings, due to the large quantities of gas introduced. Under certain conditions, then, rising temperatures around the edges of a sealed-off fire may be hopeful signs that the leakage it outward, while falling temperatures may indicate only inward leakage. One does not look for high temperatures at the fan intake of a forced-draft boiler setting.

Breathing, thermal contraction and other influences may change the gas analysis considerably at any given point yet if there is no fire behind a given stopping the percentage of air will vary without changing the proportions of nitrogen and carbon dioxide in the synthetic blackdamp which has been built up by adding carbon dioxide to the normal blackdamp. This result is modified somewhat through absorption of oxygen by the coal, but it is at least roughly true.

No. 4 South Stopping will again serve as the example, for the fire referred to above could not affect the analysis of the gases immediately behind the stopping to any great extent, inasmuch as it was over 100 ft. from the stopping and the prevailing draft was inward. Between Dec. 27 and 30 the carbon dioxide in the total sample at this stopping went down from 19.2 to 2.2 per cent and then back to 20.1, due to barometric fluctuation, but the carbon-dioxide percentage in the blackdamp remained practically constant, between 20 and 22.

The variation of the carbon-dioxide percentage in the blackdamp and its relation to the amounts of gas introduced are shown in Fig. 7. The direct variation of gas composition by analysis with barometric fluctuation is to be expected. However, barometer readings are not included in Table I, as the mine is more sensitive than the barometer in its response to changes in atmospheric pressure. Thus, the pressure observations at the stoppings are more significant than the barometer readings for showing the direction of flow of the mine gases. Table II illustrates the variation of gas analysis with barometer readings:

TABLE II—VARIATION OF ANALYSIS WITH BAROMETER

Date	Barometer reading, 9:00 A. M.	Average Carbon Dioxide Percentage in Samples Over Entire Field
Jan. 15	28.24 (falling)	13.4
Jan. 16	28.20 (rising)	11.0
Jan. 17	28.90 (rising)	9.9
Jan. 18	28.32 (falling)	12.8

Three different agencies played parts in the extinction of the Bitner mine fire: gas, water, and sealing. Before the gas was applied but after the fire was sealed an inspection of the ground, coupled with observations of the behavior of the fire, afforded ample basis for the statement that the conflagration probably would never have been extinguished by sealing alone. At least it may be said that it could not have been put out by this method unless, at tremendous expense, the falls had been

laboriously mud-sealed for a distance of nearly one-quarter mile along the outcrop of the coal seam. A considerable area was never reached by water. That is clearly indicated by the high-water line marked on the map (Fig. 1). It is, of course, safe to say that the fire would not have been extinguished in this area by any combination of sealing and water treatment.

Water was of the greatest assistance, however, in rapidly cooling certain parts of the mine which could be reached by it; in fact without water cooling it would have been impossible to open the mine within reasonable time. In addition to the sections where it was possible to submerge the roof, and hence make certain of the absence of fire, other sections which could not be flooded were treated for a part of each day with running water.

As the specific heat of water is much higher than that of gases, comparatively rapid cooling was attained. It should be emphasized that the main function of this running water, which did not reach the roof over the greatest part of the area affected by it was not to extinguish fire but to produce rapid cooling, and in this action it was very successful.

Water was not applied, moreover, until Jan. 5, after gas analysis indicated that all flame had been extinguished, and when the temperatures recorded made it evident that the possibility of forming large quantities of steam or water-gas, or of causing violent fluctuations by the introduction of water, was remote. Under these conditions cooling was much accelerated.

By building surface dams at both ends of the mine it proved possible to back the water inside the mine to the high-water line shown on the map. Without some such scheme it would have been impossible to flood any considerable part of the mine.

Reference has already been made to the refrigerating effect of carbon dioxide expanding from cylinders. The main cooling effect of the inert gas, however, is due to the exclusion of air. It may be assumed that each pound of carbon dioxide introduced prevents an equivalent weight of air from gaining access to the fire. Consequently it will prevent the generation of something like 600 B.t.u. and hence will relieve the adjoining strata from having to conduct this quantity of heat.

Have Not Had Need to Open Entire Fire Area

On March 26 a new opening was broken through the coal about the middle of the fire area, as indicated in Fig. 1. Starting from this point, by the present time (June 1, 1923) the fire area has been explored and reclaimed from end to end along the main haulage, manway and air return, and along the main gob areas on the west side of the mine. Some hot coals have been found, but the hot material was confined to small areas where the gas had not been fully effective and was in such condition that it could be wetted down and loaded without serious difficulty.

It is worthy of mention that as the combustion was early checked by the introduction of inert gas and as the area subject to fire was cooled more slowly than by the direct use of water, less injury was done to the roof.

Coal is now being produced from the reclaimed area. Smaller areas on the east side of the mine—that is, along the outcrop—have been sealed up pending the time when it will be convenient to explore and reclaim them. So far as is definitely known, there is no flame in these areas, but hot spots may exist. Exact conditions in these relatively small parts of the mine will not be known unless and until they have been explored. For obvious reasons, some worked-out parts of this area may never need to be opened.

The quantity of liquefied carbon dioxide used, and hence its cost, will depend upon the leakage and the length of time during which gas must be applied. These conditions will vary, of course, for different mines.

In the case of the Bitner fire the actual cost of the carbon-dioxide gas alone is less than 10 per cent of the total sum spent to date, the remainder being largely the expense of the direct method of fighting. Under average mine-fire conditions, if there are any average conditions, bad mine fires probably can be extinguished with inert gas for less than 50 per cent of the cost of the direct method.

It is clear that the application of inert gas should be restricted to fires which can be sealed sufficiently to avoid the consumption of prohibitively large quantities of gas. Its use is indicated wherever it is impossible to seal off the fire tightly enough to extinguish it by this means alone, and it is possible that money can be saved by reason of quicker reclamation even where good sealing is practicable. It can extinguish fires under certain conditions more cheaply than any other method. As soon as inert gas is applied it arrests the combustion of coal and the depreciation of the mine by reason of roof falls, etc. and it makes possible early opening of sealed-off areas. That it will be invariably successful, if employed intelligently under the proper conditions, cannot be denied.

State Coal Laws Handicap Retail Dealers

In a letter to its members, the New England Coal Dealers' Association, Boston, Mass., has the following to say in connection with the new coal laws in some states, referring particularly to the "Governor's Coal Law" in Massachuetts:

"The new Laws in some states are causing a little trouble for the regular dealer, but we have one case in Massachusetts where an inspector took a sample, served a legal notice on the dealer that effectively stopped coal being sold from the bins in question. 'Physical examination of this coal indicates it is unfit for ordinary use and subject to condemnation and seizure,' is the language. In this case the coal analyzed 94 per cent pure. The dealer's business suffered and he might have been closed down for over a week if he had had only the two bins in question. He has a right to sue the inspector for damages. The idea of any coal which analyzes 94 per cent pure having the appearance of being unfit for ordinary use is a preposterous situation, and the consumers of Massachusetts will find the 'Governor's Coal Law' a serious handicap the next time we have conditions similar to last winter."

District engineers of the Bureau of Mines and the engineers on its mine-rescue cars have been instructed to make written reports, whenever possible, to mine operators, containing recommendations for more effective prevention of accidents and for improvement of health conditions in the mines examined. An extract from the order issued in this connection is as follows: "The chief purpose of these safety service reports is to present directly to the operator the results of such safety investigations of the Bureau as may be specifically applicable to his particular mine, to the end that the work of the Bureau for the promotion of safety in the mining industry may be made more effective. These reports, of course, would also include suggestions and recommendations relative to safety methods, devices and practices observed in visits to other mines by Bureau engineers, which they believe could be adopted to advantage in the particular mines covered by the reports. Adoption of the recommendations in such a safety service report rests entirely with the mine operator, and the recommendations must be reasonable and practicable ones."

Theory and Operation of Electric Braking As Applied to Mine Locomotives

Greatest Field of Use on Locomotives Making Many Stops—Reduces Maintenance Costs—Proof Against Common Abuses—Transition from Motors to Generators Explained—Motors Always Started in Series

By Edgar J. Gealy
Electrical Engineer; Associate Editor, *Coal Age*

WITHIN the last few years the electric trolley locomotive, as designed for mine service, has undergone several important improvements. One of the most interesting changes has been the application of the electric-braking controller. By means of this new controller positive and graduated braking is obtainable without the application of the mechanical brake except for finally holding the locomotive and trailing load at rest.

The greatest field for the use of this new type of controller seems to be on the gathering type of locomotive, yet there are many opportunities for its use on main-haulage locomotives, especially in conditions where long grades are met, and it is necessary partially to apply the hand brake. The main-haulage locomotive as a rule makes few stops; it starts from some point where it picks up a trip of loaded or empty cars and few stops are made en route to the shaft bottom or to a distributing point where it delivers the cars. In its work the motorman is less frequently required to operate the brake than on the gathering locomotive which makes many starts and stops.

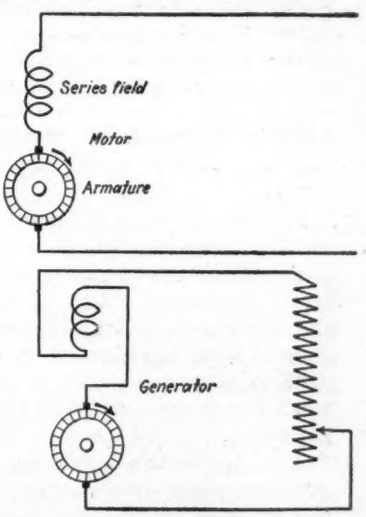
The gathering locomotive ordinarily makes many starts and stops during the day, its trips are short and frequently the locomotive and cars must be stopped at switches, room entrances and whenever couplings must be made. The very nature of the work of the gathering locomotive therefore requires frequent application of the brakes and much more braking effort must be expended in the operation of the locomotive. Consequently while the gathering locomotive is lighter in weight than the main-haulage machine the sum total of braking effort in a day is considerably greater. Aside from requiring more effort on the part of the motorman these frequent starts and stops are very hard on the equipment, wearing the brake shoes, brake rigging, flat spots on the tires and subjecting the locomotive to strains. Furthermore, the motorman may often be found to operate the locomotive with the mechanical brake partly on, with the idea of being ready at all times for a quick stop. This procedure greatly overloads the motors and frequently results in breakdowns.

Less Braking Effort Required

To relieve the motorman of most of this braking effort the electric braking controller was applied. With this new controller the locomotive is retarded by the stored-up energy in the form of momentum in the moving locomotive and trailing load. This is accomplished by providing a controller with a suitable cylinder for changing the motors of the locomotive into self-excited generators. The electrical energy developed by the generator action is absorbed in the main resistors. The amount of braking thus obtained is a function of the speed at which the locomotive drives the motors as generators and the resistance in the circuit.

With a fixed value of resistance in the circuit, the faster the locomotive is moving at the time the motors are converted into generators the greater will be the generated voltage, the greater will be the current flowing through the resistance and the greater will be the retarding effect. Under the same conditions decreasing the resistance will increase the braking effect, while increasing the resistance will decrease the braking effect. Therefore under all conditions under which the locomotive may be driving the motors as generators the less the resistance in the circuit the greater will be the retarding effect upon the locomotive. In fact it is merely a question of loading up the generators until their driving force has spent its energy and can no longer carry the load. As on any other generating system the lower the resistance across the terminals of the machine the greater the load and consequently the greater is the tendency to stop the driver and therefore the generation of power.

When the motors are acting as generators and there is considerable resistance in the circuit the locomotive will spend considerable time in giving up its energy, which is in the form of momentum; but when the resistance is mostly cut out the locomotive must give up its energy more quickly and therefore comes to a rather quick stop. When the locomotive is nearly stopped there is a point where the speed of the motors, acting as generators, is not sufficiently high to generate enough voltage to produce the necessary current to produce any further braking effort; at this point, and at all speeds slower than this it is necessary to apply the hand brake to bring the locomotive to a stop. By this method and the various graduations of resistance which may be inserted in the circuit it is apparent that the locomotive may be brought to a gradual stop without



FIGS. 1 AND 2—SERIES MOTOR AND SERIES GENERATOR CONNECTIONS

The first figure shows the dynamo operating as a motor and having a certain direction of rotation. The second figure shows the same dynamo operating as a generator. The armature is running in the same direction as when it was a motor. Closing the circuit on the generator with its series field reversed represents how electric braking is accomplished.

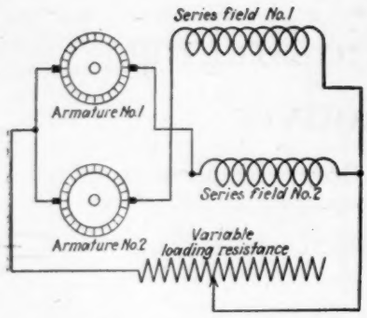


FIG. 3—CONNECTIONS OF ARMATURES AND SERIES FIELDS FOR BALANCING TWO SERIES GENERATORS

The armature of generator No. 1 is connected in series with the series field of generator No. 2, and the armature of generator No. 2 is connected in series with the series field of generator No. 1. This maintains an equal voltage on both machines, thus balancing the load while employing electric braking.

the application of the mechanical brake and the attendant strains. The degree of braking is under the motorman's control at all times, for if he finds that he is stopping too quickly, he merely has to throw off the controller or step back a notch or two, thus inserting more resistance into the circuit. It has been found by numerous tests that even with the trolley disconnected the residual magnetism of the motors, when acting as generators, is sufficient to insure almost as quick a stop as when the trolley is connected. This is an important factor in estimating the all-around serviceability of electric braking in gathering work, because failure of voltage on the trolley or the flying of the trolley pole off the trolley wire would otherwise result in serious consequences.

On a level track the motorman can bring his train to a dead stop without using the ordinary hand brake at all if he can wait long enough for the friction of the track and bearings to absorb the small amount of energy remaining in the trip after the electric braking has all but stopped the train. In fact, this is the usual condition, the action being relatively quick. He also can readily bring it to a stop on a grade by setting his mechanical brake; otherwise the locomotive will come nearly to a stop and will continue to run at a slow speed. A runaway is impossible so long as the train weight and grade are within the braking capacity of the motors (acting as generators) and the control equipment.

Another point of advantage in electric braking lies in the fact that the retarding effect of the motors is zero as soon as the wheels have stopped rotating, and there is practically no skidding of the wheels; hence there will be few if any flat spots developed from this cause.

In order to understand the operation of the electric braking controller it may be interesting to review some of the important characteristics of the series motor and series generator which bear upon the subject. To clarify the matter we will use the word dynamo as the general term for a motor or a generator and when the dynamo acts as a driver it will be called a motor and when it acts as a generating machine it will be called a generator.

A series motor generates a counter-voltage which tends to stop the incoming current that drives the motor. If a series motor is running and it is suddenly disconnected from its supply it will continue to run and generate a counter-voltage. Should the motor be short-circuited or even closed on a resistance of low value the counter-voltage would cause a flow of current through the circuit, but the direction of this current would be such as to oppose the residual magnetism in the field poles which created the counter-voltage. This counter-voltage therefore would create a current which would kill the residual magnetism in the fields and in so doing would reduce the counter-voltage to zero.

If the field of the motor is reversed with respect to the armature before the motor is short-circuited, however, the current flows in a direction through the series fields to increase the magnetism in the fields. In this way the motor becomes a generator. By loading up the circuit leading from the generator a retarding effect is produced which will tend to bring the generator to rest.

Fig. 1 shows a given connection of armature and field with a certain direction of armature rotation and the dynamo acting as a motor. Fig. 2 shows what changes must be made to change the motor into a generator. Note that with the direction of rotation the same, the series field connections have been reversed and the generator is loaded on a variable resistance to obtain electric braking.

Electric braking is quite simple when only one motor is used. When two or more series motors are used in parallel as generators some provision must be made to balance the current between them, because the voltages which they generate are rarely exactly the same in value due to small variations in construction and the composition of the magnetic frames.

If two series motors are operated in parallel as series generators, the dynamo generating the greater voltage will force current through the one generating the lesser voltage, and this current will be in a direction opposite to the direction of the inherent generated current in that generator. The result is that the polarity of the weaker generator is reversed and the two machines generate a current into a short-circuit between themselves. Under these conditions the line wires leading from the parallel connection of the two generators has no influence upon the operation of the machines, regardless of the value of any external resistance between the line wires.

To overcome this condition is rather simple when only two generators are involved. The fields of the two generators are interconnected so that the armature of one generator is in series with the field of the other. The connections are as shown in Fig. 3. This arrangement prevents an interchange of current between the two generators as an increase in the armature current of one generator increases the current in the field of the other, causing it to generate a higher voltage, thereby taking a heavier current until the load on each generator becomes balanced.

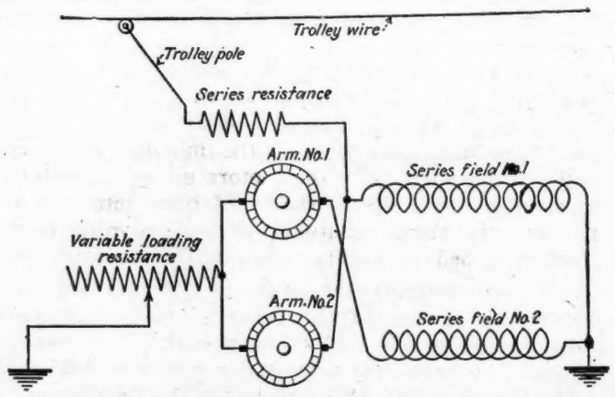


FIG. 4—COMPLETE ELECTRIC BRAKING CIRCUIT WITH TICKLER CIRCUIT

The circuit from the trolley through one of the series fields to ground assists the series field residual magnetism and quickens the action of the motors when converted into generators for electric braking.

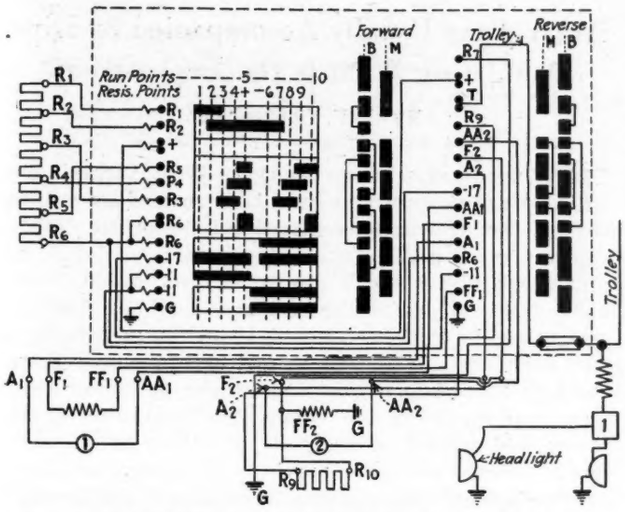


FIG. 5—COMPLETE ELECTRIC-BRAKING CONTROLLER WIRING DIAGRAM

The arrangement of the controller is quite similar to the other designs used on locomotives in mine work. The diagram shows that the wiring may hardly be classed as being more complicated than that of the ordinary controller.

To assist the residual magnetism to build up the strength of the series field and thus make the generators take their load more quickly a small current is allowed to flow through the series field of one of the generators by means of a circuit from the trolley wire through a high resistance and thence through the series field to ground. The generators will build up without this connection but the braking effect is a little slower in acting when this connection does not assist. This connection is illustrated in Fig. 4. In the diagram it is apparent that changes in the variable loading resistance varies the braking effect of the generators.

The wiring diagram of the electric braking controller as manufactured by the General Electric Co. is shown in Fig. 5. This controller embodies several additional features of special interest and importance.

With the ordinary controller careless or indifferent motormen do not always use the hand brakes when they want to stop. In many mines it is a rather too frequent practice for the motorman to needlessly "plug" the motors—that is, reverse the motors to save effort when a stop is to be made. When stopped in this way, the motors sustain a heavy rush of current and the gearing and other parts of the equipment receive severe shocks, all of which tend to shorten the life of the various parts or cause immediate damage and high maintenance costs.

Another novel feature of this controller is that the locomotive must first be started with the motors and resistance in series before the transition can be made to the parallel operation of the motors. Most controllers will start with the motors either in series or in parallel. Here again the indifferent motorman will not use the series position for slow running or for starting a load. Instead he will leave the reverse cylinder in the parallel position and start or get slow speed by running with the motors in parallel and the resistance in the circuit. This increases maintenance costs on controllers and resistances and also consumes twice as much current as that necessary for the same speed and load in the series position.

This method of operation of the locomotive with the motors in parallel when they might better be in series raises a serious question in additional power consumption. In many cases this represents a serious economic loss when a number of gathering locomotives are used. The total amount of energy wasted in this way in a year is always a matter of consideration to the engineer who is desirous of maintaining a high over-all efficiency for the electric system of the mine. Another objection to this method of improper operation is that the additional current required means additional transforming and generator capacity and also feeder capacity, while it is also the cause of circuit breakers opening up on overloads and thus penalizing all other equipment in that section by discontinuing operations until the service is restored.

This electric braking controller is a positive insurance against this particular form of waste and abuse, as it is of the series-parallel type similar to that used on the ordinary street car and the first point is always "series-motors." Consequently the motorman cannot get to the parallel operating position of the controller until he has gone through all the series points.

Fig. 6 shows a top view of the controller. The handle in the middle of the controller, called the operating or control handle, regulates the resistance in the circuit when the dynamos are acting either as motors or generators. When the dynamos are acting as motors the control handle may be operated through ten positions; the fifth position is the series running position of the motors with no resistance in the circuit and the tenth position is the parallel running position with no resistance in the circuit. These points are specially marked on the controller and should be used as much as possible, thus saving wear and tear on the resistance and also power consumption.

In the motoring position the control handle may be operated through all ten positions for either forward or reverse running. In the braking position the control handle cannot be operated beyond the fifth position. The braking increases as the handle is turned on from the first position to the fifth position. At the fifth position the locomotive will come to a quick stop. To stop dead or to hold the locomotive stopped on a grade it is necessary to operate the hand brake. All braking, except the last operation of stopping the locomotive dead, should be obtained by the use of the electric braking feature of the controller. The transition from motoring to braking or vice versa in either direction is made by the operation of the lower right-hand lever, which is locked in position until the control handle is first returned to the "off" position. This insures the proper manipulation of the equipment under all conditions. The control resistance is so balanced that when the controller is in the no-resistance

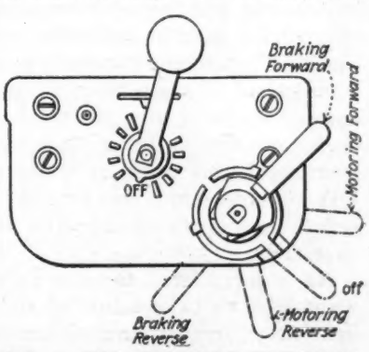
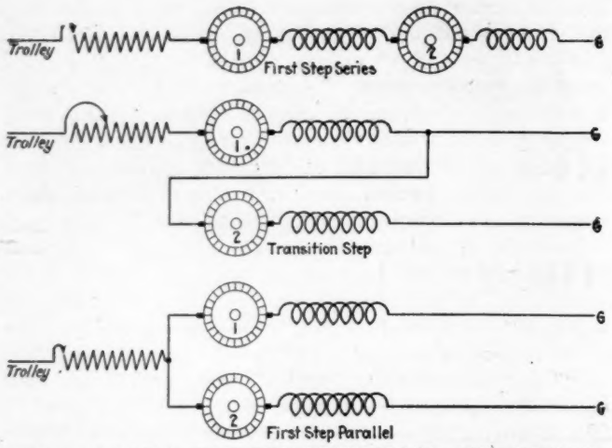


FIG. 6—TOP VIEW OF ELECTRIC BRAKING CONTROLLER

With both the operating handle and reversing handle in the off position in order to start the locomotive forward, first move the reverse handle, located on the right, to the position marked — "motoring forward" — and then move the operating handle on. To brake, move the operating handle to the off position, move the reverse handle to the position — "braking forward"—and then move the operating handle on through the first five positions as required. For motoring or braking in the reverse direction the operations are similar, as indicated by the other positions of the reverse handle.



FIGS. 7, 8 AND 9—HOW THE CONTROLLER OPERATES IN STARTING A LOAD

When the controller is operated to start a load, the motors are started in series, then later changed over to the parallel connection. All of these changes, together with changes in the amounts of resistance in the circuit, are accomplished by simply rotating the operating handle from the off position to the tenth position. This is the only operation necessary after once setting the reverse handle in the forward or reverse motor position.

series position, and the load or grade becomes severe enough to cause the wheels to spin, by moving the operating handle to the parallel position the wheels will recover their grip on the rails, provided the load is not beyond the capacity of the locomotive.

In Figs. 7, 8 and 9 the various connections of the motors and resistance are shown as the motors are being brought up to speed when hauling a load.

It is true that with the electric-braking controller the motors on the locomotive are in operation both while taking energy from the line as motors and while braking the locomotive when operating as generators. For this reason the total heating of the motors and resistance will no doubt be greater for a given day's work than with the ordinary controller. To partly offset this tendency toward too great heating, the fact that the electric controller is insurance against starting heavy loads in the parallel connection of the motors and against other abuses requiring high current consumption is important. Then again the high motor horsepower per ton of locomotive weight now used on locomotives is most favorable. With many locomotives the high motor horsepower per ton of weight has been adopted not so much from a point of view of necessary heating capacity for the work to be done as from a desire to have a locomotive whose motors cannot be overloaded, this being accomplished by making the motors so large that the locomotive will slip its wheels before the overload capacity of the motor has been exceeded.

No doubt, there are some conditions, however, under which the extra heating of the motors when used as generators in electric braking must be considered, but a proper balancing of these factors should present no serious problem.

SIZE OF PULVERIZED COAL.—There is no definite size to which coal must be ground for use in powdered-coal burning plants, although it is recommended, generally, that 95 per cent of the pulverized coal should pass through a sieve with 100 meshes to the inch and 80 to 85 per cent through a sieve with 200 meshes to the inch, states John Blizard, fuel engineer of the Department of the Interior, in Bulletin 217, just issued by the U. S. Bureau of Mines. It has been found possible to operate some furnaces with coarser coal, and found necessary for firing open-hearth furnaces to grind the coal more finely.

Are Valleys Usually Accompanied by Dips, And, if so, What Is the Explanation?

BY G. F. CLEVENBERG
Civil and Mining Engineer, Williamson, W. Va.

THE mountains of our southern West Virginia coal field are supposed to have been formed by erosion, that is, the streams have carved out the present topography from a plateau that was originally almost flat but which had a small dip to the northwest. This plateau, which composed the deltas of the Pennsylvanian, was raised by the great mountain-making movement of the Permian. The streams and rivers which flowed through this plain of low topography had their channels necessarily in the small structural dips of the strata and started immediately after the uplift to cut down into the soft and barely consolidated top strata of the old delta, and, continuing down in their meandering course, reached the beds of today, still retaining in their intrenched meanders the course they had followed when the country was level.

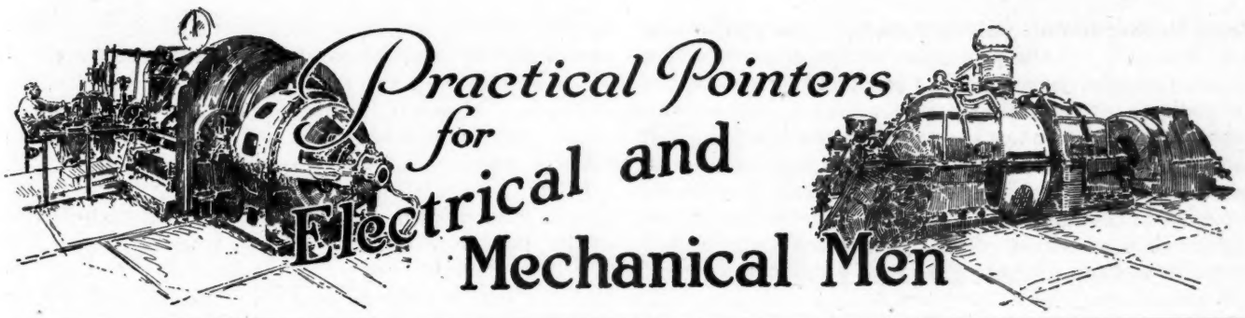
In many of our mines in the Williamson coal field I have noticed that when the working places approach any large branch or hollow the coal dips more sharply into the hollow, and sometimes this is so marked that the general dip is reversed. Often an entry approaching a hollow will begin to dip at a point about 500 ft. distant from the stream in the valley, making much trouble because of the water encountered. This dip continues till the stream is overhead, whereupon the entry begins to rise and gets back on the normal dip again in a short distance. In one mine with which I am familiar this happened when the workings passed under a small branch stream, and in another mine when the operations approached a fairly large creek. In each case the coal dipped toward the creek at about a 14-per cent grade, and flattened out after reaching the stream or creek. The normal dip in this last-mentioned mine is only about 50 ft. to the mile.

I have wondered whether this condition is universal in the dissected plateau coal fields of southern West Virginia. If so the circumstances described conclusively prove that the original streams of the plateau took their courses in the small structural dips in the strata, and if such conditions can be expected when approaching and passing under streams the trouble can be anticipated and preparations made for meeting it successfully. Such a dip would not be revealed in all cases, in fact it would be apparent only where, in the vicinity of the larger hollows, many prospect holes were opened and a careful survey was made in which the levels and elevations of the base of the coal would be carefully determined.

It would be interesting to hear from other mining men whether this condition is generally encountered where mines of the southern West Virginia or the eastern Kentucky coal field pass under the streams and the larger hollows of those regions.

THE SIOUX INDIANS claim that the United States owes them the neat sum of $750,000,000. Let us hope that they won't occupy the Pittsburgh coal-mining district.—*Tacoma Ledger.*

MR. FOSTER is in favor of "direct action." Do not deceive yourself by thinking that this means work.—*Minneapolis Journal.*

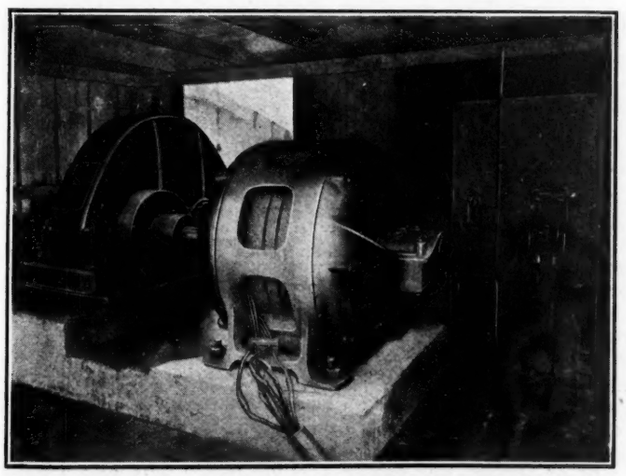


Helical Gear Reduction Unit for Mine Fan Meshes Without Impact and Saves Space

DESIRE for flexibility in the speed of ventilating fans and the wide difference in speed between fans and electric motors early led to the adoption of a belt drive because it was believed that by this means the number of revolutions per minute most readily could be varied to meet an ever-changing operating condition merely by the use of a large or a small pulley on the motor shaft. The change of pulleys in accordance with this plan is not made frequently for the reason that a marked change in the ventilation system is in evidence only at widely separated periods. So one might justly say that the average fan installation has a constant speed, and therefore, a gear drive is expedient for the purpose.

There are disadvantages which are generally accepted as facts in the driving of a fan by a belt. Power lost through slippage is perhaps the most notable of all. Even with constant attention under favorable conditions, where the shafts are accurately aligned and the belt is precisely adjusted for tautness, there is certain to be a loss of energy between motor and fan.

Reliability in the performance of vital equipment at the mine is not merely a desirability but a necessity. To obtain it without resorting to a direct drive by an unduly large slow-speed motor, gears and pinions are employed, as, for instance, on pump units. A gear drive for a mine fan is equally as effective, and in consequence offers the mine manager a surety of fan operation. It is no more flexible than the belt drive nor is it less flexible. It is far more desirable than a belt drive in that the complete unit is compact and takes up no more space than a motor-generator set, resembling the latter closely, as may be seen by an inspection of the accompanying illustration. Consequently the fan house can be made smaller than for a belt drive. An increased fan speed can be obtained by substituting a larger pinion for a smaller one; or the fan may be driven by a variable-speed induction motor which is provided with a brush-shifting device.



INTERIOR OF FAN HOUSE AT THE CEDAR GROVE MINE

The drive end of the fan unit as pictured closely resembles a motor-generator set. A temporary wooden structure was erected to house the unit but at a later date this will be replaced by a brick building.

An interesting example of a gear-driven fan installation is that of the Carnegie Coal Co. at its Cedar Grove mine, Studa, Pa. Here a 12-ft. exhaust fan which makes 120,000 cu.ft. of air per minute against a water gage of 1¼ in. is driven by a 125-hp. two-speed induction motor through a standard helical gear reduction unit which was furnished by the R. D. Nuttall Co., of Pittsburgh, Pa. The fan is so situated that it will be near the center of the workings for the next ten years or more. During the day a speed at the motor of 720 r.p.m. is reduced to 90 r.p.m. at the fan. At night or when the mine is not working the motor and fan speeds are 360 and 45 r.p.m. respectively. The gear set is incased in a housing which shelters the moving parts from dust and dirt.

The helical gears are smooth running and quiet because of their design. The slight angle of the teeth provides a mechanical condition in which there is always contact between them. As a result there can be no lost motion or chatter in the meshing of teeth, and the load is transferred without impact from the pinion teeth to the gear teeth even when the pinion is worn. Moreover, the tooth design is such that the rolling contact is increased 50 per cent for the reason that the base of the tooth is wider and thicker than is the base of the ordinary teeth of a spur gear or pinion.

Safety in Electric Welding and Cutting*

THE art of welding and cutting by means of the electric arc is subject to certain rules and safeguards recommended by fire insurance and safety organizations for the preservation of property and for protection of health, eyes, and bodies of the operators. Experience has shown that the fire hazard is not serious, due to the fact that the immediate presence of the operator and the concentrated attention which his work requires help to prevent the start or spread of any fire originating from flying sparks or molten metal.

For protection of the operator and of men working in the vicinity it is necessary to take certain precautions. If these precautions are taken arc welding becomes a perfectly safe occupation. There are at present some sixty thousand welders using the arc. We have several welders at our plant who have worked steadily with the arc for six or seven years without any apparent bad effect. In ordinary arc welding, where currents ranging

*Paper presented at the Safety Conference of the National Safety Council, Engineering Section, and the Detroit Safety Council, Detroit, June 12, 1923.

from 50 to 200 amp. only are used, simple precautions are necessary for the protection of the operator's eyes and the exposed portions of his body. The usual method of protecting eyes is the use of a face shield or head mask with glass window inserts, the glass of which is of such a composition as to absorb the injurious ultra-violet and infra-red rays. When several welders are working in the same room, in addition to the use of face shields or head masks colored glasses with side protection are worn to protect the eyes of each operator from the arcs of the others.

All exposed parts of the body are subject to a burning effect from the rays of the arc. This burning is similar to a sunburn and if the body is not protected by a covering of some kind it will cause the operator more or less discomfort or pain. The body usually is covered by ordinary close-woven clothing and the hands by leather gloves, not only to protect against the rays of the arc but against flying particles of hot metal. The gloves further protect him in handling hot parts. In heavy carbon arc welding and cutting, where currents from 200 to 1,000 amps. are used, it is necessary to protect the operator still further, as with these heavy currents the arc rays will penetrate the ordinary clothing and the flying particles of molten metal will burn through them. Usually a large, well fitting leather or asbestos apron is used, protecting as much of the body of the operator as is possible.

For the protection of men working near an arc welder opaque screens should be placed between the arc and the workers or, better still, a booth should be built around the operator, thereby shutting off all the arc rays from the surrounding part of the factory.

Care has to be taken regarding the painting of the interior of an arc welding booth. If a paint that reflects the rays of an arc is used the operator may be subjected to eye flashes from the side and back of his face shield, or to the burning of the back of his neck or ears. A paint that will absorb the dangerous rays should be used on the interior of a booth and on all equipment located within it. A simple, satisfactory paint for this use is composed of zinc oxide and oil, which may be given any desired tint with lamp black.

Where heavy welding or cutting is being done and where galvanized iron or steel or materials that are oily is being welded it is desirable in safeguarding the health of the operator to provide ventilation ducts or fans to carry away the smoke and fumes.

In metallic arc welding where direct current is used with an open circuit voltage of from 40 to 60 volts and a welding voltage of 20 it is not necessary to pay much attention to the protection of the operator from an electric shock. With alternating-current welding this is a little more serious, as the operating voltage ranges from 100 up to as high as 175. If the operator is not careful while changing electrodes the higher voltage is likely to give him quite a shock. There is no positive way to protect the operator against this voltage, however, if he is in direct contact with one side of the circuit in handling his work and with the other side of the circuit in inserting his electrode material. He must be careful not to get in contact with both at the same time.

This same condition applies to resistance welders used for railway work where the trolley voltage is from 450 to 650 direct current. In this case it is necessary for the operator to be careful to keep free from grounds while changing electrodes. Welding resistors for use in railway welding are sometimes provided with a push-button station under the control of the welder for opening a contactor in the welding circuit while changing electrodes. However, many welders object to carrying around this pushbutton station and would rather take the extra precautions necessary when changing electrodes.

In many installations where a large number of small articles are welded, particularly with the automatic welder, instead of building a booth around the operator to protect outside workers and instead of providing the operator with a mask or face shield an inclosed cabinet is built around the operation itself, inserting in this cabinet a colored glass protective window through which the operator can watch the progress of the welding.

Where many welders are working on small work it is customary to build a series of small booths, the tops of which are open and extend above the operator's head, the front of the booths being supplied with the welding control apparatus and with a bench on which material to be welded is placed. The backs of the booths are protected with a series of curtains which are closed by the operators before starting to weld. This makes a compact and satisfactory arrangement.

For the protection of welding apparatus, safeguards, as applied to apparatus of similar nature, are used such as circuit breakers, contactors, fuses, enclosed switches, enclosing boxes for control apparatus, insulated couplings, gear cases, insulated holders, etc.

D. H. DeYoe,
Schenectady, N. Y. General Electric Co.

To Avoid Clinker Trouble

(1) Keep your slice bar out of the fire. Ashes, when mixed with incandescent coal, melt and cause clinker.

(2) If you have to use the slice bar, run it gently along the grate bars, raising it just enough to break up the clinker.

(3) Throw water into the ashpit. It turns to steam, which softens the clinker.

(4) Run a ½-in. steam line into the ashpit, or, if necessary, install a small steam blower. The steam rots the clinker and the air increases the draft.

(5) Overheated grates cause clinker. Keep the ashpit doors open.

(6) Throw out all sulphur balls and pieces of slate before firing. They make clinker.

(7) If you have to force your boiler, use high fusing coal. —*Courtesy W. A. Marshall & Co., New York.*

Spontaneous Combustion of Pennsylvania Coals.—In the course of a study of the spontaneous combustion of coal being made at the Pittsburgh experiment station of the U. S. Bureau of Mines, J. D. Davis, chemist, and J. F. Byrne, research fellow, conducted experiments on spontaneous heating of coal starting from room temperature. Upper Freeport heated 3 deg. from room temperature in six hours. Upper Kittanning coal gave no heating whatever. This corresponds to results of practice. Kittanning coal usually is sold by dealers with a guarantee not to fire. It is semi-bituminous and similar to Pocahontas coal but not so firable. Pittsburgh coal rose a maximum of 2.7 deg. above room temperature in 72 hours. The rate at first was rapid, then slowed as the temperature continued to rise—higher temperature again caused acceleration. In these experiments the coal was first treated in a current of coal gas to bring equilibrium with the thermostat, then a current of oxygen was passed through under adiabatic conditions. The apparatus seems to work satisfactorily and the problem now resolves itself into finding the optimum rate of air or oxygen flow as a means of comparing the heating qualities of coals.

New Equipment

Solid Steel Frog Requires No Splice Bars

A NEW cast-steel frog cast in one solid piece and hence requiring no splice bars for its installation was recently placed on the market by L. A. Green, of Pittsburgh, Pa.

The absence of rivets and bolts in the construction of the frog eliminates opportunity for acids in the mine water to loosen up the various parts. The rails are bolted to the frog by means of extension pieces, similar to splice bars, which are cast as an integral part of the frog. This arrangement makes a very rigid joint.

DURABIL STEEL FROG

Probably more derailments occur at frogs and switches than at any other place in the mine track. These derailments frequently are due to loose track accessories. Here is a frog which is made of one piece, thus reducing the number of parts to a minimum.

The composition of the steel used in the manufacture of the frog is asserted to be such that the frog will outlast several of the more common types of frogs used for mine work.

New Universal Thermal Relay

A THERMAL relay designed to be universally applicable to any surface has recently been brought out by the Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio. A brass bulb at the lower end of the relay makes contact with the surface whose temperature is to affect the operation of the relay. A liquid element in the bulb expands with the heat transmitted to the bulb and operates a push-button switch at the upper end of the relay. A novel feature in connection with this push-button switch is that it may be placed in the housing as readily to make the relay circuit closing as circuit opening. This makes the relay applicable to control circuits which would shut down a machine or give a signal. After the relay has operated, the push-button switch is reset by depressing the button shown at *B* in Fig. 2.

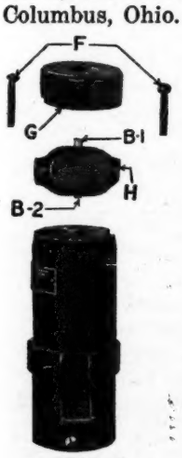


FIG. 1
EXPLODED VIEW OF RELAY

B-1 and *B*-2 are the push-buttons of the switch; one is used for circuit opening while the other is used for circuit closing. *F* are machine screws which hold the cap and switch in the casing.

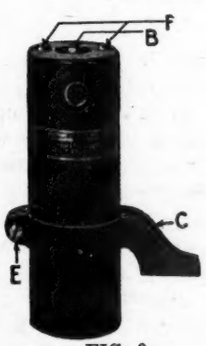


FIG. 2
ASSEMBLED THERMAL RELAY AND BRACKET

C is the mounting bracket and *E* the adjusting screw for properly locating the relay. The over-all length of the relay is 6½ in.

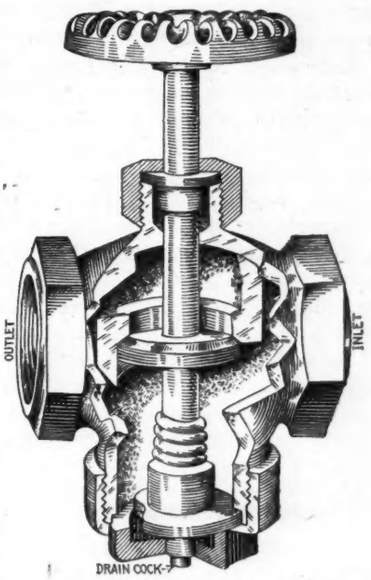
Obviously, the relay may be adapted to any system of control using either the circuit-opening or circuit-closing feature.

The relay was designed primarily for the protection of electric motors against overloading and overheating, which may be caused by any number of reasons such as single-phasing, too frequent starting, overvoltage, etc. It is applicable also to the bearings of small machines and also to transformers.

The uses of the relay seem to be unlimited as it may even be used to start spare generating equipment when the operating generator equipment heats up due to continued overload.

A Globe Valve with Many Improvements

THE line of equalized reciprocating valves made by the Murphy Valve Co., of Columbus, Ohio, is complete, the company announces. Outstanding features of the Murphy Globe valves, already on the market are, the higher the pressure the tighter the valve seats itself, one-piece disk and stem, removable cap, and the valve can be packed under pressure. When the valve is closed the pressure is confined in the lower half of the valve body so that there is no pressure on the stuffing box. It may therefore be packed on the line while under pressure. This arrangement also causes the disk to seat itself more tightly when closed, the pressure exerting a closing force upon the disk. The disk and stem of the valve make it impossible for the disk to become loosened on the stem, a common occurrence on valves used on feed lines where there is a pump pulsation or water hammer.



GLOBE VALVE WITH MANY NEW FEATURES

The pressure on the inlet side of the valve is exerted against the disc, which seats itself on the valve seat more tightly when closed. The drain cock may be opened and the valve cleaned of sediment by the pressure of the lines.

Another interesting and important feature is that the valve may be opened at the drain cock and the pipe line drained from both directions. This is a sure protection against frozen and burst pipes and a ready means of cleaning the line.

M. GEORGES, CHIEF MINING ENGINEER OF FRANCE, says that while America possesses coal reserves of 2,000,000,000,000 tons; Germany, 410,000,000,000 tons; England, 190,000,000,000 tons; Russia, 60,000,000,000 tons; and Austria and Hungary, 54,000,000,000 tons, France has only a supply of 17,000,000,000 tons. The normal pre-war consumption of coal in France was 60,000,000 tons a year, so that France should have sufficient fuel for 300 years. In his opinion France has ample time to evolve alternate forms of energy and to devise ways and means to economize in her coal consumption.

Problems of Operating Men

Edited by James T. Beard

Faulting of an Inclined Seam in Coal Mining

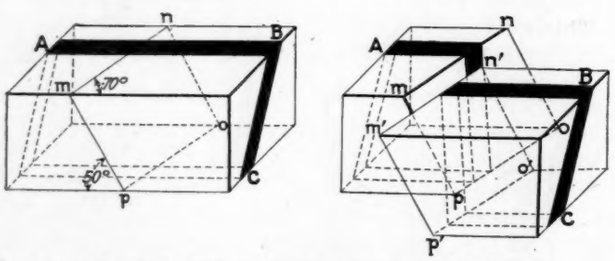
Strike of Fault Plane Seldom Parallel to Strike of Seam—Fault Plane May Have Any Position Relative to Plane of Seam

THE issue of *Coal Age* for April 12 contained a number of interesting articles, but I was particularly absorbed in reading that by James S. Chalmers, page 589, regarding the working of highly inclined seams. That in connection with the inquiry on "Locating the Coal Beyond a Fault," page 608 of the same issue, leads me to offer the following suggestion.

References made by previous writers, in regard to locating the coal beyond a fault, incline me to think they almost invariable assume that the strike of the fault plane follows the same direction as that of the seam itself. Of a dozen or more faults I have encountered in inclined seams, this has never yet been the case.

Invariably, the strike line of the fault plane makes a considerable angle with that of the seam itself. The angle may reach 90 deg. For that reason, it is impossible to illustrate the true nature of the situation on a profile similar to what has been presented.

It is clear that should the fault plane be perpendicular to the plane of the seam it would correspond to the plane of the profile or, at least, its strike line would be parallel to that plane and nothing would be effected.



ISOMETRIC PERSPECTIVE SHOWING FAULT OF DISLOCATION

Evidently, a perspective diagram similar to that I am showing in the accompanying figure is needed to illustrate the real situation.

With that end in view, I recently constructed a model of plastic clay, in the shape of a rectangular prism. In order to represent the coal seam in this model, I inlaid a piece of cardboard *A B C*, inclined at a considerable angle with the sides of the prism.

This being done, the next step was to cut across the entire block or prism in a plane *m n o p*. In the figure, this plane is indicated as having a strike that makes an angle of 70 deg. with the strike of the seam and has a pitch or dip of 50 deg. from the horizontal plane. The cutting plane *m n o p* is intended to represent the plane of the fault.

Again, on the right of the figure is shown an isometric perspective that illustrates clearly the relative situation of the two sections of the seam, after the slip has occurred. It is evident that the calculation of the continuance of the seam beyond the fault is not as simple as when the strike of the fault plane parallels that of the seam.

As shown on the right of the figure and as often happens, the movement has taken place in two directions, one corresponding to the dip of the fault plane and the other being in a horizontal direction as a side-slip. Keeping these things in mind, a careful study of the figure will show that the movement may either increase or decrease that which would take place were the strike lines parallel. In other words, the dislocated portion may be either on the side of the footwall or the hangingwall, depending on the angle of the strike line and the relative inclination of the fault plane with that of the seam.

In every case, a practical mining man, after making an active survey of the fault, will be able to determine how to proceed to find the continuation of the seam. For example, in the case shown in the figure, he would start driving a crosscut to the right in the hangingwall.

Staunton, Ill. HENRY BOCK.

What Is Lacking to Make Mines Safer

Certificate laws in many states—Mine superintendent the responsible head—His certification needed to insure safety in the larger mines.

NUMEROUS references have appeared recently, in the columns of *Coal Age*, regarding the reduction of mine accidents. It has been shown how a large percentage of them are such as might have been prevented had the management possessed the proper regard for avoiding possible accidents.

All of us have our own way of thinking and each is guided by his own intelligence and personal experience in the work of mining. What I have to say, however, may be of interest to operators and a benefit from a human and economic standpoint.

It is well known that the principal coal-producing states have laws requiring the employment of certified mine foremen, assistant foremen, firebosses and, in some instances, hoisting engineers. There are few who will deny that these laws have proved a benefit to mine owners and mine workers alike. Our mines, today, are worked under better conditions by reason of these laws.

On the other hand, any one who has given the matter serious thought can hardly fail to realize that the present certification laws apply more effectively to smaller mines where the mine foreman is generally the responsible head. The same is not the case at larger mines, employing a superintendent whose duties make him responsible for the safe operation of the entire mine both underground and on the surface.

My candid opinion is that our certification laws, in order to be effectual in the safe operation of all mines, should be extended so as to include the certification of all mine superintendents and others having direct charge of work underground.

It cannot be denied that the superintendent, by virtue of his position, exerts a powerful influence on the work of the mine foreman, even where the latter is supposed to have a free hand in the management of underground operations.

There are mines where the management is awake to this situation and realizes that the mine foreman should be the responsible head in respect to underground conditions where he is given a free rein. But more often the foreman is seriously handicapped either for lack of material or in respect to the character of the men he is obliged to employ.

Co-operation of Superintendent and Foreman

It goes without saying, that the most effectual system possible, in the operation of a mine, is that where the mine superintendent and mine foreman work together on a mutually equal plane of knowledge and experience in the operation of the mine.

If this was true at all mines, there would be no need of asking that our certification laws be modified. However, instances are numerous, in fact it might be said to be a general rule, that the management of many large mines are not alive to the seriousness of the situation as it regards the actual responsibility for the safe control of underground work.

The superintendent being regarded as holding the higher office is very generally considered the responsible head and the mine foreman is made subject to his orders. It is this fact that creates a dangerous state of affairs, under conditions that may arise with frequency in the operation of a mine. Therefore, it is only fair and reasonable to require the same degree of knowledge and experience of underground work on the part of both the superintendent and the foreman if they are to co-operate mutually.

Danger in Foremen Selecting Their Assistants

There is still another phase of this subject concerned in the selection and appointment of assistant foremen. It is unwise to leave their selection wholly to the foreman. Human nature is human nature the world over and, however competent and honest a foreman may be, he cannot be expected to choose as his assistants certain ones whom he knows aspire to his position and who, it may be, possess certain qualifications superior to his own.

As "competition is the life of trade," it is also the one element that offers the strongest inducement to mine officials of every class to make their work efficient and produce results. Therefore a chief factor, in the efforts of managers to make their mines safe, is to promote honorable competition throughout the rank and file of their employees.

Let me say in closing that the employment of a superintendent who has not the knowledge and practical experience regarding underground operations is like attempting to run a mine car on three wheels instead of four. It is an expense to the company, a detriment to safe operation of the mine and a positive handicap to a good foreman in charge of the work underground. That has been my experience as mine manager. In this state (Illinois) the foreman of a mine is called the "mine manager" and the fireboss is termed "mine examiner," which many think better describes his duties in the mine.

Then, finally, if our mines are to be made safer, accidents reduced to a minimum and profits increased, all officials in direct charge of work must be men of practical experience, who should hold certificates of competency granted by the state examining board. The question of the certification of mine superintendents is not new to the readers of *Coal Age*, who have argued in its favor almost universally.

DAVID YOUNG.

Edwardsville, Ill.

Electric Cap Lamp a Part of Every Fireboss' Equipment

Constant efforts made to improve lighting in the mine—Electric cap lamp the fireboss' friend—Reasons why firebosses need the lamp.

I HAVE read with interest the several letters that have appeared in recent issues of *Coal Age*, relative to a fireboss using an electric cap lamp while testing for gas. The subject calls to mind different references I have seen in books and periodicals, regarding the earlier methods of supplying an illuminant that would be free from danger in an explosive mixture.

One statement that seems almost unbelievable says that the earliest attempt made to illumine the darkness of the mine consisted in the use of fishes eyes and other putrid matter that gave a phosphorescent glow in the Egyptian darkness underground. A little later, this means of lighting gave place to the use of the old "steel mill," which was a disc of metal made to revolve very rapidly in contact with a piece of flint, causing a continuous shower of sparks.

Property of Wire Gauze Discovered by Davy

Both of these means proved most unsatisfactory and it remained for the eminent chemist, Sir Humphry Davy, in 1815, to discover the property of cool wire gauze to prevent the passage of flame through its mesh.

This discovery of Davy gave to the mining industry a lamp that produced a good light and was safe in the presence of explosive gas. The well known Davy lamp is still a favorite among a great number of firebosses who have long been accustomed to its use in making their examination of the mines.

Following the introduction of the Davy lamp, more than a hundred years ago, many improvements have been made and various types of safety lamps are now in use. The chief object has ever been to increase the illuminating power of the lamp and its security in a gaseous mixture. The result has been that a flame safety lamp capable of giving more than 1 cp. has been produced and approved by the Bureau of Mines as being safe for use in gaseous mines.

Advent of the Miners' Electric Cap Lamp

Now comes the electric cap lamp, which is another advancement in the work of finding a better light that is safe in gas. It is universally agreed that this incandescent lamp or bulb is of no value for testing for gas, its usefulness in the mine being confined solely to the giving of a good light, which is the equivalent of several of the best types of safety lamps.

In this connection, it is amusing to read the claim of one writer that he "cannot spare the time to hide his electric lamp which blinds his eyes when making a

careful test for gas." His account of having to shed his coat, vest and overshirt and even then finding his trousers wet from perspiration is a suggestion of an endurance test as a footracer, rather than a test for explosive gas.

TIME SAVED BY ELECTRIC CAP LAMP

In my opinion, the man would save time by carrying an electric lamp in his cap, which would enable him to move about more quickly and with less exertion, and he would not then need to lower and raise again the flame of his safety lamp to make each test. It would take less time to screen his cap lamp with his hand when making a test, than is now required to lower and raise the flame of his safety lamp.

Those who claim that a fireboss "should use no other light than that of an approved safety lamp," must remember that the electric cap lamp is also an approved lamp for use in gas. The laws, in many states, require the fireboss to examine for *all* dangers and, for that purpose, he should have as good a light as any other person entering the mine.

Briefly stated, the reasons why a fireboss should use an electric cap lamp, in connetcion with his safety lamp, is that the brighter light of the cap lamp will enable him to travel faster and detect danger of insecure roof and coal that he would not observe with the dim light of his safety lamp.

Also, he will be safer when climbing high falls and steep pitches that require his attention and a good light to reveal the conditions existing about him. Lastly, in the event of the safety lamp being extinguished, which often happens, the light of his cap lamp will enable the fireboss to retreat to a place of safety where he must relight his safety lamp.

Walsenburg, Col. WILLIAM H. JAMES.

Inquiries Of General Interest

Withdrawing Mine Timber When Robbing Pillars

Careful Examination of Roof Conditions the First Requisite—Use of Chain Post Puller Keeps the Workman Out of Danger Zone

MANY accidents are recorded as the result of drawing timbers, in the work of robbing pillars. As is well known, it is of the utmost importance to leave no timbers standing in the waste, since they act to prevent the fall of roof whereby the pressure on the pillars is reduced and the work of robbing made less dangerous. In our mines, we have resorted to different methods of removing these timbers when drawing back the pillars, and though I can say that we have had comparatively few accidents in that work, the results have not been altogether satisfactory.

One method, which we adopted because it promised greater safety to the men, was to blast out the timbers when they could not be knocked out with any assurance of safety. A hole was drilled in the post, say ten inches or a foot below the roof, and a small stick of dynamite inserted and exploded in the hole. This method, however, had the disadvantage of destroying such posts, which were buried in the fall of roof and lost forever. I want to ask for an explanation of the most practical way of recovering mine timbers in a condition to be used again in the work of robbing. MINE FOREMAN.

Clifty, Tenn.

The growing scarcity of mine timber makes its recovery in good condition an item of economic importance in the operation of mines. Not only is the supply of timber conserved, but the cost of production in the mining of coal is greatly reduced. On this account the method of blasting out timbers should only be employed where it is impossible to remove the posts with safety, by other methods.

The most practical method to adopt for the recovery of post timber is to employ a device known as the "Chain Post Puller," the use of which is illustrated in Fig. 1. When employing this device it will be observed that the workman operating the machine is wholly outside of the danger zone, being protected by substantial posts standing between him and the timber he is pulling.

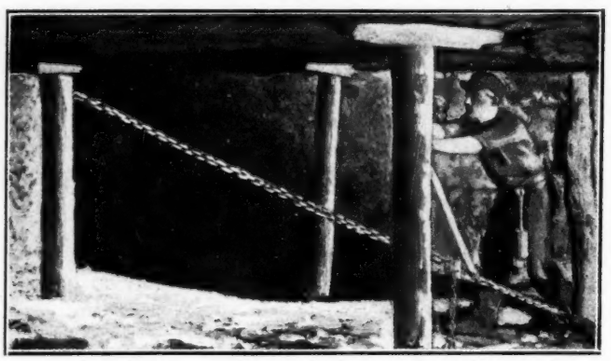


FIG. 1—DRAWING A POST WITH A CHAIN POST PULLER

No explanation is needed regarding the operation of the device, the action of which is clearly shown in the figure. A short tail chain serves to anchor the machine to the foot of a post stood, for that purpose, in a good foothole cut in the bottom to give the post the needed resistance to the pull of the chain.

A longer chain is made fast around the head of the post that is to be pulled. The other end of this chain is attached to a movable piece that travels on the rack bar shown in the figure. By means of the hand lever there shown, this sliding piece is moved backward on the barrel, notch by notch, producing a great strain on the chain that pulls the head of the post free from the mine roof.

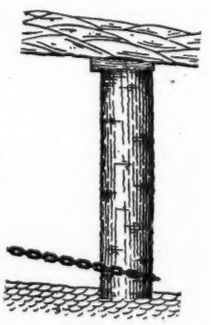


FIG. 2. THE ANCHOR POST

In Fig. 2 is shown the anchor post mentioned above, with a short length of chain attached to its foot. The use of this device has prevented many an accident from occurring in the dangerous work of drawing mine posts.

Examination Questions Answered

Hoisting Engineers' Examination, Springfield, Ill., Mar. 19, 1922

(Selected Questions)

QUESTION—*An indicator attached to a winding drum is run by means of a gearwheel meshing with a worm on the end of a shaft, and the small gearwheel that is connected to the pointer has 15 teeth. If the circumference of the dial is 32 in., how far will the pointer move for each revolution of the drum?*

ANSWER—Assuming that the worm is on the end of the drum shaft, each revolution of the winding drum will pass one tooth of the gearwheel attached to the pointer. Then, since the gearwheel has fifteen teeth, the pointer will make one complete revolution of the dial for each fifteen revolutions of the drum. Therefore, in a single revolution of the drum, the pointer will move 1/15 of the circumference of the dial or 32/15 = 2-2/15 in.

QUESTION—*Name two kinds of safety valves and state which is the best type of valve to employ.*

ANSWER—The spring safety valve and the ball-and-lever valve. The latter is being rapidly replaced by the former, because of the greater reliability of the action of the spring valve, in response to any change of pressure.

QUESTION—*Define the terms: Forward pressure; back pressure; mean effective pressure; and state what is the difference between pressure above the atmosphere and pressure above a vacuum?*

ANSWER—In steam engine practice, the term "forward pressure" relates to the pressure of the steam in the cylinder, acting to drive the engine. The term "back pressure" relates to a certain resisting pressure, which is opposed to the motion of the engine and caused by the resistance of the discharge ports to the escape of the exhaust steam from the cylinder.

The term "mean effective pressure" relates to the average pressure of the steam, in the cylinder driving the engine, and is equivalent to an assumed constant pressure of the steam throughout the length of the stroke.

The difference between pressure above the atmosphere and the pressure above a vacuum, is best explained by saying that the former is the effective working pressure producing motion in an engine exhausting against the atmosphere, disregarding the loss due to any back pressure in the cylinder. On the other hand, pressure above a vacuum is the absolute pressure, which includes both the working pressure and the pressure of the atmosphere.

QUESTION—*How many horsepower will it take to pull twenty loaded cars up an incline 400 ft. long, in one minute, the weight of the coal in each car being 3,000 lb. and the weight of the empty car 900 lb., if the resistance of rope and pulleys is 13 per cent and the grade 7 per cent?*

ANSWER—The total moving load, in this case, is $20(3{,}000 + 900) \div 2{,}000 = 39$ tons. Then, assuming a track resistance of, say 15 lb. per ton, the grade resistance being 20 lb. per ton, for each per cent of grade, or $7 \times 20 = 140$ lb. per ton, on a grade of 7 per cent, the total resistance of track and grade is 155 lb. per ton, to which must be added 13 per cent for the resistance of ropes and pulleys, giving a total resistance of $155 \times 1.13 = 175.15$ lb. per ton of moving load. This makes the total resistance when hoisting a loaded trip of twenty cars weighing 2.36 tons, $175.15 \times 39 = 6{,}830.85$ lb., which is the average pull or load on the rope, under the assumed conditions. Finally, assuming an average velocity of 400 ft. per min., with a load of 6,830.85 lb. on the rope and an efficiency of 85 per cent in the hoisting engine, the required power of the engine for this hoist is

$$\frac{6{,}830.85 \times 400}{0.85 \times 33{,}000} = 97.4, \text{ say } 100 \text{ hp.}$$

QUESTION—*(a) What is the tensile strength of Norway iron? (b) Give the breaking strain of a 1½-in. crucible, cast-steel hoisting rope having six strands, nineteen wires each; and state the safe working load?*

ANSWER—(a) The ultimate strength of Norway iron varies from 48,000 to 50,000 lb. per sq.in., and the elastic limit of the metal varies from 26,000 to 27,000 lb. per sq.in.

(b) The breaking strain of a 1½-in. crucible, cast-steel hoisting rope, six strands, nineteen wires, is given by the formula

$$S = 39d^2 = 39(1\tfrac{1}{2})^2 = \text{say } 60 \text{ tons}$$

In mining practice, the factor of safety employed for hoisting, in shafts, will vary from 5 for shafts of moderate depth, say 50 or 60 yd., to 8 or 10 for very deep shafts. In this case, assuming a factor of safety of 5, the safe working load of this rope, in a shaft 200 ft. deep, should not exceed 12 tons.

QUESTION—*(a) What special care is required to be given to hoisting ropes and cages? (b) How would you determine whether a hoisting rope is unsafe and what portion of the rope would you consider the weakest part, or the part most liable to give out first?*

ANSWER—(a) Hoisting ropes and cages must be carefully examined at the beginning and end of every shift, to make sure that they are in safe working condition. Special care must be taken not to overload the cage or to hoist at a speed exceeding the safe limit, which must be determined in accordance with the depth of the shaft and the kind of equipment. At regular brief intervals, it is necessary to examine with particular care the entire length of the hoisting rope by allowing it to pass through a bunch of waste held in the hand, as the cage is hoisted or lowered very slowly. The purpose is to detect any loose wires or broken strands and any undue amount of wear of the outer strands that would seriously affect the strength of the rope.

(b) That portion of the rope that may be considered the weakest part and more liable to fail is the lower end of the rope, within a few feet of the coupling of the cage, because this portion is often more subject to sharp bending and sudden jerks when the cage is first started off the bottom under a heavy load. Another portion of the rope that may be considered to develop weakness is that portion over the hoisting sheave, above the shaft, when the cage is on the bottom and started too suddenly, whereby a heavy bending strain is developed in the outer wires of the rope, above the sheave-wheel at the top of the headframe.

Power of Miners' Union Based on Violence, Says Brief of Utah Operators

Non-union coal operators of Utah, through counsel for the Bituminous Operators' Special Committee, submitted to the U. S. Coal Commission on June 28 a brief attacking the United Mine Workers of America, declaring that organization to be an impotent and unconvincing machine unless permitted to indulge in violence.

The brief contends that the sole purpose of the union in the campaign in Utah during the nation-wide strike of last year by representatives of the United Mine Workers was to prevent Utah coal reaching the public while the strike lasted and that in the campaign the union was trying only to strengthen its monopolistic grip on the country, and not at all to benefit the miners of Utah. To support this the brief gives a short description of similar campaigns in non-union fields all over the country which were carried on simultaneously with the attack on Utah.

In support of the former charge, the Utah brief cities numerous instances of assaults on loyal workers and even on disinterested citizens who were mistaken for strike breakers or company officials.

These attacks brought about the dispatch of troops to the affected district by order of the government. Firearms were taken from mine guards and strikers, it says, and law and order quickly restored. "With the establishment of law and order," the brief declares, "the attempt of the United Mine Workers to stop the production of coal in Utah completely failed.

"Deprived of the weapons of violence and intimidation, and compelled to obey the law, the invading agitators of the United Mine Workers of America were powerless to further disorganize the community. By lawful methods they could accomplish nothing. The result demonstrates with clearness that at least in the fields where living and working conditions are good the United Mine Workers of America, with the present high cost of its militant organization, requires the artificial support of the 'check-off' in its system of enforced taxation to keep its existence."

In closing the brief the operators submit a list of thirty-five names of United Mine Workers of America who have been tried and convicted of violations of the law during the strike in Carbon County, Utah. Eight others are awaiting trial for similar offenses.

Coal-Mine Fatalities in May Decrease In Number and Ratio to Output

Fatal accidents at coal mines throughout the United States numbered 170 during May, 1923, according to reports received by the Bureau of Mines of the Department of the Interior from state mine inspectors. The production of coal during the month was 54,649,000 tons, hence the fatality rate was 3.11 per million tons. In May last year the fatality rate was 4.22 based upon an output of 20,636,000 tons, including 35,000 tons of anthracite. In April, 1923, the rate was 3.49. Because of the miners' suspension of work last year, the production of fresh-mined anthracite in May, 1922, was completely stopped; in May, 1923, the anthracite output was 8,573,000 tons. For bituminous mines alone, the fatality rate in May, 1923, was 2.67 per million tons as compared with 4.17 in May a year ago.

During the first five months of the present year the fatality rate for bituminous-coal mines was 3.55 per million tons, based on 809 deaths, as against a rate of 3.70 for the corresponding months last year, based on 611 deaths. The rate for 1923 represents a reduction of 4 per cent. For anthracite mines alone the five-month fatality rate for 1923 was 5.36 per million tons, based on 228 fatalities, as against a rate of 6.72 for the first five months of 1922 based on 147 fatalities. The rate for 1923 represents a reduction of 20 per cent.

The fatality rates per million tons for the principal causes of accidents during the first five months of 1922 and 1923 were:

	1922	1923
Falls of roof and coal	1.906	1.765
Haulage	0.819	0.603
Gas and dust explosions	0.551	0.670
Explosives	0.176	0.174
Electricity	0.107	0.122

COAL-MINE FATALITIES DURING MAY, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground												Shaft					Surface						Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes.	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	2												2						1					1	3	14
Alaska																									0	0
Arkansas	1												1												1	0
Colorado		2		10									12												12	4
Illinois	8		3					3					14												14	1
Indiana	1					1							2												2	0
Iowa																									0	1
Kansas							1						1												1	0
Kentucky			1	1									2												2	10
Maryland																									0	0
Michigan																									0	0
Missouri																									0	0
Montana																									0	0
New Mexico	3		1										4												4	2
North Dakota																									0	0
Ohio	10		2			1		1					14							1				1	15	3
Oklahoma								1					1												1	0
Pennsylvania (bituminous)	19	1	6					2					28						2					1 3	31	18
South Dakota																									0	0
Tennessee			1										1												1	0
Texas																									0	2
Utah	1												1												1	1
Virginia		1											1												1	3
Washington	1		1										2												2	1
West Virginia	19		3			4		1		1			28						1					1 2	30	25
Wyoming			1					1					2												2	0
Total (bituminous)	65	4	19	11		6	1	9		1			116						3	2				2 7	123	86
Pennsylvania (anthracite)	21	1	5	1		5		1	1			8	43	3			3	3					1	1	47	1
Total, May, 1923	86	5	24	12		11	1	10	1	1		8	159	3			3	3	3	2			1	2 8	170	
Total, May, 1922	38	2	21		11	3		3		1			79	1	1		1	3		1			4	5		87

Coal Retailers Urge Incorporation of Unions, Abolition Of Government Fuel Yards and Adoption of Net Ton

The National Retail Coal Merchants' Association, in annual convention at Scranton, June 25, 26 and 27, went on record as favoring incorporation of labor unions, abolition of government-owned fuel yards and advocating a uniform 2,000-lb. ton throughout the United States. The association expressed accord with, and in the purposes and confidence in the personnel of the U. S. Coal Commission and its intention to aid the commission in every possible way, and urged all retail coal merchants to furnish promptly the information requested by the commission's questionnaire.

Roderick Stephens, chairman of the Governmental Relations Committee, reported that the committee has good grounds to believe that Secretary of the Interior Work will recommend to Congress the passage of legislation to abolish the Goverment Fuel Yard.

Secretary O'Toole made public a letter he had sent to John Hays Hammond, chairman of the U. S. Coal Commission, in reply to a statement filed with the commission by the United Mine Workers of America in which it is alleged that "distributors are taking a profit on anthracite equal to that of the operators" and that "agreements (exist) among the retail coal dealers to dispose of anthracite at a uniform price."

"To support these allegations," says the letter, "the United Mine Workers quote selected self-serving extracts from various reports of different individuals and groups, and they append statistical tables prepared from unreliable or unknown sources, without authentication, and which, even if supported by reliable proof, are composed of facts covering so short a period, so limited a territory and so small a proportion of the retail tonnage in each section covered, as to constitute no adequate basis for any general conclusions.

"Therefore, placing full reliance upon your good judgment and sense of fair play, we shall rest our case so far as the charges contained in this document are concerned, without attempting to tabulate the mass of material we have collected from each of several cities referred to specifically, which if so presented would support our statements regarding the inaccuracy of the statistics furnished by the representatives of the miners' union."

In his report on the anthracite division of the Trade Relations Committee, Samuel B. Crowell, of Philadelphia, told of sending a letter to S. D. Warriner, chairman of the General Policies Committee of Anthracite Operators, asking for a conference at which government fuel yards, municipal fuel yards, legislation (particularly in Pennsylvania) regarding standards of preparation, publicity with particular reference to the use of buckwheat and smaller sizes and other matters should be discussed. The meeting was held and after an hour's discussion it was Mr. Warriner's opinion that owing to the unusual amount of time and energy which all branches of the industry were putting upon the questionnaires from the U. S. Coal Commission and the fact that until the final report was made by the commission, time was not opportune that the suggestions be acted upon. However, further conferences between the operating end of the anthracite industry and Mr. Crowell and members of his committee have been held and consideration given to some of the suggestions. The committee recommended to all coal dealers, particularly those doing business in the anthracite district, to individually help the sale of No. 1 buckwheat.

Marshall Keig, of Chicago, chairman of the bituminous coal committee, making a verbal report, appealed to producers to prepare their coal properly and escape criticism. It is the duty of producers and wholesale dealers to educate the public in the use of bituminous coal and he declared that the retail dealers would be glad to join them in the educational campaign.

Homer D. Jones, of Chicago, president of the Association, in his address delivered at the first session of the convention, told the members that the principles of the organization as set forth in the Declaration of Principles are "truth, honesty, courteous service and fair dealing" and that any individual merchant or aggregation of merchants falling short of this measure is undesirable as a member of the organization. The retail dealer is as honest, dependable and law abiding as any other group of business or professional men, he declared, and it is safe to say that 95 per cent of them never have and never will commit any act or acts that are detrimental to the industry or to the coal-buying public.

Samuel B. Crowell, vice-president of the Newton Coal Co., Philadelphia, was unanimously elected president of the association to succeed Mr. Jones. Other officers and directors chosen were: Vice-presidents, Marshall Keig, Chicago, Ill.; William A. Clark, Northampton, Mass.; J. Maury Dove, Jr., Washington, D. C.; Ernest R. Sweeney, Kansas City, Mo.; Charles B. Staats, Albany, N. Y.; W. L. Vail, Toledo, Ohio; Resident Vice-president, Joseph E. O'Toole, Washington, D. C.; Treasurer, Richard J. Wulff, Brooklyn, N. Y.; Directors, Eli J. Barkume, Detroit, Mich; Charles B. Bodwell, Manchester, N. H.; Joseph H. Lucking, Newark, N. J.; John S. McEwan, Albany, N. Y.; W. R. Feuquay, St. Joseph, Mo.; J. Harry West, Baltimore, Md.; L. P. Coan, St. Louis, Mo.; Joseph Rademacher, Milwaukee, Wis.

The following evening the delegates and many operators and wholesale dealers were the guests of the Anthracite Producing & Sales Co. at a banquet at Irem Temple, Wilkes-Barre, the journey to that city being made in a special train over the Delaware & Hudson R.R. The Chicago delegation, wearing costumes of white capes and large straw hats with wide red bands, was headed by a band of music, while the delegation from Detroit was attired in blue overalls and straw hats. J. Hayden Oliver, general counsel, Glen Alden Coal Co., was the toastmaster.

Cadwallader Evans, Jr., consulting engineer, speaking on "Mining Anthracite" told the dealers that in his opinion there can be no reasonable expectation of a decrease in cost due to a reduced cost of labor except such as will come through a reduction in the wage scale, nor a reduction in cost due to easier mining conditions for these conditions, at least in the northern anthracite region, will grow more and more severe each year. The opening up of the virgin reserve tonnage of the larger companies in the southern anthracite region will no doubt replace the diminishing output from the northern fields as years go on, but with no decrease in cost.

Other speakers at the banquet were Charles Dorrance, Jr., vice-president, Hudson Coal Co., who spoke on the "Preparation of Anthracite," and Alan C. Dodson, president of Weston Dodson & Co., whose subject was "Sales and Distribution."

The last day of the convention was devoted to trips to various mines, the delegates leaving the Hotel Casey in nearly 100 automobiles and visiting the Marvine breaker of the Hudson Coal Co., the Baker breaker of the Glen Alden Coal Co., and the Laflin breaker of the Hudson Coal Co. Many of the visitors remained until later in the week and inspected the inside workings of the mines.

12,910;000 Barrels of Portland Cement Produced During May

Production of portland cement during May, 1923, according to the U. S. Geological Survey, totaled 12,910,000 barrels, compared with 11,176,000 barrels in the corresponding month of 1922 and 11,359,000 barrels in April, 1923. Shipments for the month were 14,257.000 barrels against 12,749,000 in May a year ago and 12,954,000 barrels in April, 1923. Stocks at the end of May were 10,115,000 barrels compared with 12,893,000 barrels at that period in 1922 and 11,463,000 barrels at the end of April, 1923.

Nationalization of Coal Mines Would Be Fatal Venture, Says Brydon

President Harding's stand against nationalization of coal mines, as expressed in his address at Cheyenne, Wyo., June 25, was declared today by John C. Brydon, president of the National Coal Association, to reflect the opinion of economists throughout the country, industrial experts who know that such nationalization would spell disaster for the consumer as well as the miner.

"The competition which now exists in the coal industry, particularly in the bituminous field," he said, "is an advantage to the public. If the government were to run the mines, a non-competitive condition would exist, resulting in inefficiency and consequent reaction against the consumer.

"Furthermore, it seems to me to be obvious that it would be utterly impracticable for the government to operate the mines even if constitutionally possible, either under a system of ownership or of direct control. Bituminous mines spread variously through thirty of the forty-eight states and anthracite mines run thickly in eastern Pennsylvania. There are approximately 7,000 individual coal producers or companies, with some 10,000 mines, engaged in the bituminous field alone. They employ more than 600,000 miners and their yearly output runs between 450,000,000 and 550,000,000 tons, according to the national demand. Approximately 200 operating companies are engaged in anthracite mines, which turn out from 90,000,000 to 100,000,000 tons a year and employ about 150,000 men."

President Brydon declared that federal ownership or control would destroy competition among these widely scattered mines and would throw upon the government the handling of intricate labor problems involving the fixing of wages. "And what is of great importance," he said, "the taking over of the mines by the government would involve a huge increase in the public debt at a time when the country is already under the burden of an unprecedented war debt. From every public viewpoint nationalization would be a fatal venture."

Massachusetts Attorney General Corrects Misunderstanding of Pure Coal Law

Enactment of the Massachusetts pure-coal law, drawn up to prevent the sale of fireproof coal in that state, is causing considerable apprehension to the coal trade there, it being asserted that it will materially curtail shipments of anthracite to the Bay State. For that reason Eugene Hultman, State Fuel Administrator, has asked Jay R. Benton, State Attorney General, to give an opinion on the provisions of the act and its workings. The Attorney General's reply, under date of June 14, is as follows in part:

"Sub-section 249A of the act provides, in substance, that the Department of Public Health, local boards of health, the Director of Standards and local sealers of weights and measures and their authorized agents may enter places where coal is stored or kept for sale and may inspect coal or take samples. Samples taken must be tested. If the coal is unfit for ordinary use it may be condemned, seized and destroyed, or otherwise disposed of than for ordinary use.

"This is the only section of the new law which relates to condemnation and seizure of coal. Because there has been some misunderstanding relative to the law I desire to call your attention to several important provisions.

"The only coal which may be condemned and seized is coal which is unfit for ordinary use. *This means coal which will not burn.* Coal which will burn may neither be condemned nor seized. Secondly, no coal may be condemned or seized except by the Department of Public Health, which is a *state* department, or with its approval. *Local* sealers of weights and measures may not under any circumstances condemn coal. Local boards of health may condemn coal *only* with the approval of the Department of Public Health. You will thus observe that the state department is the *only* authority which determines finally whether coal will not burn and whether it should be condemned. This means that the same standard of unfitness is applied throughout the state through the medium of one central body, and that local influences or prejudices cannot enter into the determination of the question whether the coal will not burn and whether it should be condemned.

"The law is very similar to the so-called pure food law relative to the condemnation and seizure of meat, fish, vegetables, produce, fruit and provisions which are unfit for food, and which law has been in existence in Massachusetts for more than fifty years. Everyone now admits that the pure food law is an absolute necessity and that it works no hardship or inconvenience upon any honest or reputable dealer. The present coal law works in practically the same manner, except that coal may be condemned *only by one central authority*, the Department of Public Health.

"The law is designed to prevent coal which will not burn from being sold in this commonwealth. It has been in operation slightly less than three months and has amply demonstrated its efficacy in keeping non-burnable coal out of the consumers' hands. It has been administered in a reasonable and efficient manner, and with an increase in the force of the Department of Public Health, where all analyses of coal are made, the administration of the law will be still further expedited and much improved.

"No honest or reputable coal dealer or operator should have the slightest occasion to fear the working of the law or its effect upon his business or property. Dishonest dealers or operators who seek to fill the bins of the consumers with coal which will not burn will find that such coal will not be tolerated in Massachusetts."

Court Signs Reading Segregation Decree; Dissolution Ordered Within Six Months

Judges Buffington, Davis and Thompson, in the U. S. District Court at Philadelphia, signed the decree of the court segregating the Reading Company from the coal properties. The decree is based on the third modified plan submitted by the Reading Company, and orders the dissolution in six months from June 27.

The decree provides that after the new mortgages have been executed in place of the existing general mortgage, the tender of the new bonds in exchange for the present general mortgage bonds are to be held open for three months.

Although the decree is called a final decree, there may be further litigation in the case on a provision of the third modified plan increasing the interest on the new railway stock from 4 to 4½ per cent, and on the coal stock from 5 to 5½ per cent as a means of compensating the general mortgage bondholders for financial losses which will ensue from a separation of their security by the segregation.

Segregation of the Reading Company and its underlying railroad and coal companies from each other was ordered by the U. S. Supreme Court in 1920.

Utilities Consume 2,980,425 Tons of Coal In April; Power Production Declines

Electric public-utility plants consumed 2,980,425 net tons of coal during April, according to a report just issued by the U. S. Geological Survey. This compares with 3,351,462 tons consumed during March, according to corrected returns.

Fuel oil consumed by public-utility plants in April totaled 1,006,423 barrels, compared with 1,166,148 barrels in March. The average daily production of electricity by public-utility power plants during April was 149,300,000 kw.-hr., or 2 per cent less than the average daily output in March and about 3 per cent less than the record-breaking rate of February.

The average daily production of electricity for the first four months of 1923 and the proportion produced by water power were as follows: January, 153,300,000 kw.-hr., 34 per cent; February, 154,400,000 kw.-hr., 33.9 per cent; March, 152,500,000 kw.-hr., 36.3 per cent, and April, 149,300,000 kw.-hr., 39.8 per cent. The increase in the amount of water available for the use of hydro-electric power plants and the increase in the capacity of water-power plants is reflected in the increase in the proportion of the total amount of electricity produced by the use of water power.

Famous 226 Indictments Dismissed but Profiteering Case Against 125 Coal Men Is Continued

Criminal indictments against 226 coal operators, union officials, miners and coal corporations were dismissed in federal court in Indianapolis June 28 on motion of Harry M. Daugherty, U. S. Attorney General. The cases had been pending since the return of indictments by a federal grand jury Feb. 25, 1921. Charges that operators and miners had combined to control the soft-coal industry of the country in violation of the Sherman anti-trust law were contained in the indictments. Belief that a conviction could not be obtained was the basis of the motion to dismiss the cases, according to a lengthy statement read by Mr. Daugherty to Judge Albert B. Anderson.

However, indictments against 125 operators and union officials returned in 1920 under the Lever Act to prevent profiteering, remained on the court docket. The 125 defendants, practically all of whom were numbered among the 226 now relieved of the Sherman law indictments, are free on their own recognizance. The profiteering case is "indefinitely postponed." Attorney General Daugherty said he would take no action in this case "for some time."

The Attorney General said in his statement before moving dismissal of the 226 Sherman Act indictments that many things done at joint meetings of operators and miners constituted a conspiracy. Such practices will not be permitted by the government in the future, he said. In making the motion to dismiss, he said one of the reasons was to make it impossible to say that the legal branch of the government was unnecessarily impeding the progress of legitimate business.

Government to Attend More to Public's Rights

At the same time he denied that the government was taking a backward step in enforcing the Sherman Act. In the future, he said, the government would give more attention to the rights of the general public. He said many of the acts complained of in the indictments were to some extent due to the efforts of government officials during the war to bring about co-operation between coal miners, operators and the railroads to stimulate coal production.

At the conclusion of Mr. Daugherty's statement Judge Anderson granted the motion and ordered the cases *nolle prossed.* He made no comments and adjourned court immediately. The grand jury investigation which resulted in the indictments two and a half years ago was instituted on instructions from Judge Anderson.

Following the reading of the Attorney General's statement, Indianapolis lawyers who attended the hearing, June 28, said Mr. Daugherty said he believed miners and operators had been guilty of entering into illegal agreements and performing illegal acts, but that the best thing to do was to wipe the slate clean and begin over again.

Some paragraphs were particularly pertinent. One passage follows: "I have no hesitation in saying that usually many of the things agreed upon at the meetings between the representatives of the operators and representatives of the miners, but not often made public, constitute a conspiracy. The public is fed up with the idea that there is a great and stubborn controversy between the contracting parties, when in fact there is no real contest at all and the fake pretensions are intended only to alarm the public so that it will consent to give any price for coal in order to be insured against freezing.

"The intelligent people of this country have grown impatient with the constant quarrel—sometimes only a pretended quarrel—between operator and miner spokesmen, which takes place every few years and lately more frequently, resulting in great losses to industry and great losses to the workingman, to say nothing of the great hardships to everybody. Hereafter the government will give more attention than it has heretofore to the rights of those who suffer the greatest loss by reason of those unlawful acts and who are entitled to the first consideration.

"We may say, avoiding the burden of too much detail, that the government cannot deny in this case that the collective bargaining between the operators and miners, scales committees, the commonly called check-off system and the distribution of statistics, each set forth in the indictment as a means for the accomplishment of the unlawful conspiracies charged, were well known to the then responsible government officials and that to say the least, such acts were permitted by such government officials without protest.

"I believe the acts complained of were unlawful. I have, however, reached the conclusion that the evidence which the defendants would be able to submit to the jury is more or less convincing on the question of intent, and is more than necessary to create a reasonable doubt of guilt. That being so, I believe a verdict of not guilty would be the inevitable result of the trial of this case. I am, therefore, convinced it is my duty to enter a *nolle prosequi* in this case."

Institute to Discuss Inspection Problems

The program for the meeting of the Mine Inspectors' Institute of America to be held in Pittsburg, Kan., July 10, 11 and 12 will be devoted largely to sessions in which inspection problems will be discussed, but provision also has been made for entertainment features, including a banquet and a tour of the Pittsburg mining district.

The principal discussion topics and the leaders are as follows:

"Electric Machinery in Gaseous Mines and Its Limitation for Safety," James Dalrymple, chief inspector, Colorado.

"How to Recognize a Dusty Mine from the Standpoint of Danger," Robert Medill, chief of Department of Mines and Minerals, Illinois.

"Should the Use of Black Blasting Powder Be Prohibited in All Bituminous Mines?" Lawson Blenkinsopp, chief inspector of mines, Kentucky.

"What Can Be Done to Reduce Accidents from Falls of Roof, (a) by additional legislation; (b) by the operator; (c) by the miner; (d) by the state inspector," J. J. Walsh, chief of Department of Mines, Pennsylvania.

"Is Compensation an Aid in Reducing Mine Accidents?" Jerome Watson, chief of Division of Mines, Ohio.

"What Reduction in Accidents Has Resulted from Safety Organizations Conducted by the Operator and What Are the Main Features of Any That Have Proven of Benefit?" Robert Lambie, chief of Department of Mines, West Virginia.

"Is It Practicable to Frame a Basic Mine Law Suitable for All Bituminous Mine Conditions as a Model for Promotion of Uniformity in State Laws as They Relate to Accident Prevention and General Safety?" James Sherwood, chief mine inspector, Kansas.

"In What Manner Can the Federal Bureau of Mines Be of Greatest Assistance to the State Mine Inspectors?" Dr. J. J. Rutledge, chief of Bureau of Mines, Maryland.

Drop Burns Reorganization Plan

The officers and board of directors of Burns Bros., New York, have abandoned the proposed plan of readjustment of the capital structure of the company and the merger of the property with the National Coal Corporation. The plan was proposed by the Board of Directors and recently submitted to stockholders, the latter having voted their approval at a meeting held earlier in the month. M. F. Burns, president of the Burns Bros. organization, declined to comment on the matter. Consequently an official reason for dropping the plan is lacking, but according to reports in the New York financial district the recent sharp decline in the stocks of the company greatly upset the program which officials had in mind.

Must Keep Mines Working in Solving Hard Coal Problem, Say Operators

Declaring that the public will be satisfied with no solution of the anthracite question that does not insure uninterrupted operation of the mines, the anthracite operators through their counsel, Walter Gordon Merritt, submitted recommendations looking toward that end in a statement to the U. S. Coal Commission on June 4, just made public. "Were the diagnosis of the labor situation similar to that of other industries," says Mr. Merritt, "we would not urge remedies which look to any power or agency beyond the control of the parties directly interested but would place our confidence in the wish of these parties to work out some voluntary plan of co-operation. . . . The unfortunate experience of the immediate past, however, and an analysis of the reasons for this failure of existing arrangements demonstrate that the present psychological background requires some more authoritative remedy to restrain the disorders which we have portrayed."

Mr. Merritt then reviews the proposals to avoid general suspension on the termination of agreements, discussing in turn compulsory arbitration, prohibition of strikes and lockouts except where an offer of arbitration has been made and rejected, compulsory investigation with prohibition of strikes and lockouts pending investigation, as illustrated by the Canadian Industrial Disputes Act and the Colorado Industrial Commission Act, and concludes by saying that if none of these is adopted all strikes should be unlawful except when authorized by a two-thirds secret vote and that the anthracite industry should be kept independent of the bituminous-coal industry.

The fundamental defect in the present system, according to Mr. Merritt, is not the character of the agencies for settling disputes but lack of definite authoritative remedy to enforce the submission and collection of damages or indemnity. "Under prevailing conditions in the anthracite industry," he says, "no form of industrial government, however Utopian, will be of avail unless this defect is overcome." The operator, he states, is without the requisite authority to correct these conditions, for he may not join with his associates in declaring a sympathetic lockout as in the building trades, for the public must have coal. Mr. Merritt does not think that the remedy for this condition can be found within the miners' organization, the control of which is today deteriorating.

The remedy, Mr. Merritt concludes, must be supplied by the government in behalf of the public, and he recommends to this end legislation the essentials of which should be as follows:

"(1) It shall be the duty of the government (state or national, as the case may be) to collect for the public treasury from the district union having jurisdiction of the union men where an unlawful strike takes place $1 per day per man for every day each union man is engaged in such strike.

"(2) It shall be the duty of the government to collect for the public treasury from any operator or operators engaging in a wrongful lockout $1 per day per man for every day each person is so unlawfully locked out.

"(3) If the government should fail on request promptly to commence proceedings for the collection of such indemnity, any person, association or corporation may commence such suit, and after deduction of reasonable disbursements, including attorney's fees fixed by the court, shall pay over the balance to the public treasury.

"(4) The pendency of a private suit under the last paragraph shall not prevent the government from subsequently prosecuting a similar suit in its own behalf, and either or both sides may be prosecuted to a conclusion, provided that more than one indemnity shall not be collected.

"(5) In the event that the district union is obliged to pay such damages on account of the action of any local union or group of men belonging to any local, the district may in its discretion reimburse itself by collecting all or any part of said damages from the local union having jurisdiction of the men engaging in such unlawful strike.

"(6) The remedy prescribed in the proposed law should not be construed as an exclusive remedy to the derogation of any other remedy which any of the parties involved might otherwise have against each other."

Government Moves to Divorce Railroads From Ownership of Coal Lands

Before the U. S. Court of Appeals in Cincinnati on June 8 litigation begun by the Attorney General of the United States in 1911 to force the Lake Shore & Michigan Southern as well as other railroads to divorce themselves from all ownership interest in coal lands and especially those lying in the Hocking field in Ohio, which is alleged to be in violation of the Sherman Anti-Trust act, was renewed by Benson Hough, U. S. Attorney for the southern Ohio district, and a great array of legal talent.

The original case was heard by Judges Kappen, Warrington and Denison in the federal court at Grand Rapids. Judge Warrington has since died, so the case went before the other two and Judge A. M. J. Cochran of the northern Kentucky district.

In December, 1912, the court ordered the Hocking Valley and other railroads which were involved to dispose of the coal lands and a decree in this case was entered on March 14, 1914, confirming the sale of lands known as the Sunday Creek Coal Co. to John S. Jones, of Granville, Ohio, for $50,000 and the assumption of a $4,000,000 mortgage held by the railway companies.

Another decree was entered on Nov. 11, 1916, confirming the sale of the Buckeye Coal & Railway Co. to Mr. Jones for $450,000. It developed that the Hocking Valley R.R. has a mortgage for $20,000,000 on its property to protect its bondholders and that the mortgage contained a clause providing for the payment of 2c. a ton royalty on all of the lump coal taken from the mines.

The new litigation that was argued on this occasion was partly an action on the part of the government to force the Hocking Valley R.R. to get rid of this royalty connecting it with the coal companies, on the ground that it might be a temptation on the part of the road to give preference to the coal company in transportation facilities. In addition Mr. Jones as the owner of the Buckeye Coal Co. filed an intervening petition asking that the royalty provision be cancelled as illegal.

Attorney Charles Van Brunt, of New York, acting as counsel for the Central Trust Co. of that city, holder of the $20,000,000 mortgage, contended that the royalty is valid and that it has so been held by the Common Pleas Court and Court of Appeals of Perry County, Ohio, and that this was due to be paid to the trust company. This royalty amounts to $75,000 already and its total is estimated to run to $400,000 on all the coal lands.

Attorneys John P. Wilson, of Columbus, and Lawrence Maxwell, of Cincinnati, represented the Hocking Valley R.R. and also contended that the royalty clause was valid and that this road was negotiating a $50,000,000 mortgage to take up the $20,000,000 mortgage and care for other debts.

After hearing all argument the judges took the case under advisement.

Commission Issues Consumers' Price Guide

With the idea that domestic consumers can determine for themselves whether or not they are being charged excessive prices for anthracite, the U. S. Coal Commission is issuing statements showing the cost of stove anthracite on dealers' sidings.

The first of these statements covers various towns in the New England states and shows by towns the mine price and the freight on stove anthracite for the last shipment received prior to May 15, 1923, as reported to the Coal Commission by the retail coal dealers.

The information is intended for local consumption and is a guide to the consumer to indicate whether he is paying a reasonable price for his coal.

What the Interstate Commerce Commission Decided

That assigned cars and private cars are not probibited by the Transportation Act.

That, nevertheless, the practice of assigning cars, private or system, is unjust, unreasonable, unduly and unreasonably preferential to mines receiving the cars and unjustly discriminatory against and unduly prejudicial to mines not receiving them.

That after Sept. 1 all cars, including private cars, must be distributed on a pro-rata basis and that all cars placed must be counted against the mine's allotment.

That hereafter the Interstate Commerce Commission will assign cars to particular mines under its emergency powers as necessity arises.

The decision, by including private cars, is a complete victory for the Central Pennsylvania Coal Operators. The National Coal Association did not attack private cars.

The private coal-car owners are expected to seek an injunction to stay the commission from depreciating their investment by this ruling.

Seven of the Commissioners signed the decision; four—Hall, Daniels, Potter and Cox—dissented.

Important Step Toward Stabilization of Coal Industry Seen in Abolition of Assigned-Car Practice

The most important single step toward stabilization in the coal industry was taken when the Interstate Commerce Commission abolished the railroad practice of assigning cars. This seems to be the opinion of the great majority of coal producers. It is pointed out, however, that the retention of this great advantage is dependent upon the attitude of the coal producers themselves. If advantage is taken of the situation to exact unreasonable prices from the railroads or if the railroads should be able to demonstrate that they cannot fuel themselves properly without assigned cars, as they have contended, the same body which has issued this order has the power to undo it. This victory for the coal operators was attained on a seven to four decision. Should two members of the commission become convinced that this order was not working properly, revocation doubtless would be prompt.

There is no reason, however, to believe that the coal-producing industry is so lacking in vision as to attempt to gouge the railroads. From Sept. 1, the effective date of the order, the practice of buying coal with cars will cease. Cars, private and otherwise, must be counted against the distributive share of each mine. It is just possible that the private-car interests can delay the effective date by obtaining an injunction, but it is believed that the chance is small of obtaining an injunction which would endure during the life of the litigation which it is reasonably certain the private-car owners will bring. It is thought unlikely that the railroads will take the case to the courts.

Commissioners Hall and Daniels, in their dissenting opinions, simply argued the legal and technical points involved. It remained for Commissioner Potter, however, to go outside of the record and assail the coal industry in what is regarded by many as being partly gratuitous.

The commission has attached significance to the fact that the Pennsylvania, the New York Central, the Louisville & Nashville and other important carriers did not present during the consideration of the case any statement of the reason which have impelled them to adopt and maintain the practice of assigning cars. Very apparently the commission attaches much importance to the fact that a large number of carriers provide themselves with fuel without resort to this practice, as space is taken in the opinion to present in tabular form the names of those companies.

Heretofore the commission has clung tenaciously to its decisions in the Hocking Valley and Traer cases, in which the assigned-car practice was upheld. In this decision, however, it is frank to say that "the rule evolved in the early decisions was not the fruition of right experience." The commission does not hesitate to call attention to Commissioner Lane's statement in 1910 that the distribution of cars to coal mines was based largely upon interest, prejudice and pull.

While the majority of the commission held that the assigning of cars does not contravene the Interstate Commerce Act, Commissioner Eastman is convinced that it does. "I am unable to escape the conclusion," he says in his concurring opinion, "that it was the intent and is the meaning of the law that in times of car shortage every mine should be limited to a pro-rata share of the available car supply and that in computing this share every car furnished to the mine, whether private car or railroad-fuel car, or car for commercial loading, should be counted. Under the assigned-car practice now in effect, however, it appears that the number of such cars placed at a mine may, and often does, exceed its pro-rata share of the available car supply. It does not seem to me that in such cases the cars are being counted 'against' the mine. The purpose, as stated by the House Committee, when the bill was reported, was to avoid 'any possibility of the recurrence of the evil of what is known as assigned cars.' "

Commissioner Potter thinks "assigned and private cars perform essential functions which cannot be accomplished without them. Next to labor, coal costs are the highest item of operating expense. No agency should leave undone anything within the legitimate exercise of its powers to bring about a reduction of coal prices. From every quarter there is demand upon the carriers for increased efficiency and reduced operating costs. At such a time we, the guardians of public and carrier interest, are compelling the carriers against their will to adopt practices which will impair efficiency and increase costs."

At another point in his opinion Commissioner Potter declares that "it is well known that mines assured of continuous operation favorable for low-production costs will contract at lower prices. Opponents of assigned and private cars object to that desirable result. In order to maintain unhealthy and uneconomic conditions in the coal industry they contend that they should have a part of the order of the buying roads at high prices, although the interests of the general shipping public, which pays the carriers' coal bill, requires low fuel prices. The opponents of the private and assigned car demand that the interest of the many be sacrificed for the interest of the few, and we have sustained them."

"No industry that tolerates unnecessary expense should expect to prosper," continues Commissioner Potter, "and the coal industry could not survive if it were not able to pass on to consumers the consequences of the industry's mismanagement. The industry should clean house. Many want to clean house. They cannot do it alone. We have the power to assist the worthy and compel the unworthy through revision of the rate structure and the extended use of assigned and private cars. We should do what the consumers' interests require and almost, it might be said, forget the producer. We should construe the law as directing us to

require the use of equipment as public interest demands to serve best the fuel need."

In the opinion of some the decision bears unmistakable evidence of having been rendered with an eye to the well-being of the coal industry. Some regard it as catering to mine labor.

Illinois Sees Good and Evil in Ruling

Wide divergence of opinion among Illinois coal operators greeted the decision of the Interstate Commerce Commission against the assigned-car rule. At first flush and before any of them had had a chance to read the decision in full, one group thought the decision had no teeth because the commission still has power to issue special rulings creating preferential car distribution whenever an emergency arises, thus practically nullifying the force of the new order of things. Another group felt that the decision would be of real effect in the Middle West only if it prevented railroads from giving car preference to their own mines on their own lines—a point that was not clear in the first news of the decision. The third group felt that the decision is a fine and constructive piece of work by the commission which is bound to help remedy the evils of the coal industry.

There is in the Middle West, however, a small group of operators who find themselves in a position different from the rest. They are the ones with long railroad contracts whose prices were fixed on an assigned-car basis.

"I approve of the abolition of the assignment of cars," said one of that small group," but what effect is it going to have on our long-term contracts with railroads? The price was set low because we were to be guaranteed plenty of cars and steady running time. The question is, will car supply be so poor at times under the new decision that our running time will be knocked flat and our costs mount to a point where we will be giving away our coal? That's something to worry about, but the only thing we can do is just wait and see what happens."

The jobbers are the class that is consistently happy over the decision. Almost to a man they feel they are going to do more business this year than they ever do normally. They expect to see the percentage of coal traded on the spot market mount from 25 to 50 per cent during the next eight months.

Midwest railroaders still confess to many puzzlements and a great degree of dissatisfaction over the decision. They are certain to try to prevent the decision from becoming operative by applying for an injunction before Sept. 1. The railroad meeting in Washingtgon July 10, where the legal talent of the carriers will assemble, is expected to produce some course of action for the lines to follow.

"Of course," said the vice-president of one of the biggest coal carriers in the country, "if this is going to prevent us from getting coal from our own mines, there's bound to be trouble. That certainly would be unwarranted interference with the rights of a railroad and would interfere with our giving the public and the coal producers the best service of which we are capable."

The railroads will claim that there is no essential difference between railroad coal in railroad-owned mines and railroad coal now in storage along the lines. They say that if carriers cannot give their own mines a full and free car supply, then, by the same sign, they cannot use their cars for unhampered movement of their storage coal from stockpile to point of consumption, and that surely the Interstate Commerce Commission is not empowered to regulate car supply to storage piles.

A high official of a Western line thinks that the I.C.C. can hardly restrict the movement of private cars, while Chicago coal companies owning no private cars say that if private cars run unrestricted, then there is no point whatever to the decision.

"Wouldn't it be foolish," queries this rail official, "if the commission said to my line: 'You can't move but 50 cars to day from a certain mine when that mine has 100 cars of its own standing right at the tipple? There would be the extra 50 cars ready to load; there would be the mine ready to load them; there would be our railroad able and willing to move the whole 100; but nothing could be done simply because there were not railroad cars enough to give other mines in the same neighborhood also 100 cars that day. Seems to me the commission will modify its decision."

It is generally conceded among Chicago railroaders that railroads will be forced into greater storage this summer if the commission's decision actually covers car supply to railroad-owned mines. Up to the end of the week there was no change of plan on the part of railroads, because of the uncertainty in the situation. Only a few lines, such as the Illinois Central, the Burlington, the Wabash and the Big Four are storing. They may enlarge their storage and roads that had decided they couldn't afford to store may go in for a few hundred thousand tons. This remains to be developed in the next week or so.

Canada Has No Fear of U. S. Prohibiting Export of Coal to Canada

A special committee of the Canadian Senate, appointed to deal with the question of the fuel supply of Canada, in its final report declared that there is little danger that the United States would prohibit the export of coal to Canada.

"There is an abundance of evidence to the effect that the coal areas of Canada, east and west, are sufficient to supply the fuel needs of our entire population for an indefinite period of time," says the report. "A large percentage of the collieries now in operation—more particularly those in western Canada—are capable of increasing their output to a very considerable extent with little or no capital cost, and would undoubtedly do so if markets for their increased output were available.

"Within recent months the coal operators and transportation interests of Canada have been giving a good deal of consideration to the question of reducing freight rates, the desirability of providing further and better facilities for handling and storing coals, and the necessity of educating the public to use Canadian coal.

"As regards the duty of the state as represented by federal, provincial and municipal governments," the committee has no hesitation in recommending "that every possible effort be made by those in authority to encourage the public to obtain their supplies of coal or other fuel from Canadian sources. The fact that we imported for consumption last year 13,017,025 tons of coal at an approximate cost of $61,112,428 from the United States and other countries should impress everybody with the necessity of utilizing our own fuel resources to the fullest extent."

An exhaustive examination was made of the possibilities of coke. "As every ton of such coke when made from Canadian coal, lessens our dependence on anthracite, we are hopeful that this process will be further utilized in Canada," is the conclusion of the committee.

New England Retail Coal Dealers Report on Labor Conditions

The New England Coal Dealers' Association has issued an interesting condensed report on labor conditions, obtained from information sent in by about 250 members. A digest of the facts with respect to wages and hours is:

Maine, 14 communities reporting—Eight-hour day in three; nine-hour day in ten; ten-hour day in one. Teamsters get from $18 to $24 per week; chauffeurs, $21 to $30; helpers, $18 to $24.

New Hampshire, 15 communities reporting—Eight-hour day in one; nine-hour day in ten; ten-hour day in one; varying hours for different firms in three towns. Teamsters get from $18 to $30, the latter being one exceptional case where the firm has double teams; chauffeurs, $21 to $31.50; helpers, $18 to $24.

Vermont, 11 communities reporting—Nine-hour day in ten; trucking contract in the other. Teamsters, $18 to $25.50; chauffeurs, $18 to $30; helpers, $16 to $21.

Massachusetts, 74 communities reporting—Ten-hour day in one; nine-hour day in fifty-five; eight-hour day in twelve; varying hours in other towns. Teamsters, $17 to $32; chauffeurs, $21 to $33; helpers, $17 to $20.

Anthracite Miners Demand 20-per Cent Wage Increase, Two-Year Contract and Full Union Recognition

High Lights in the Tri-District Convention

Spurred on by John L. Lewis, the convention threw three alleged Communists into the street, thereby vindicating the conservative character of the miners' union.

Voted 11 demands, including 20 per cent increase to tonnage men and 33 per cent to day workers and a series of others, all rejected in 1920 by the Thompson Commission.

Left their scale committee free to negotiate with operators but bound them to refer agreement back to vote of membership or to a reconvened Tri-district convention, thereby meeting specific request of U. S. Coal Commission.

Passed no strike vote, leaving the way clear for peaceful settlement.

Gave Lewis as good a "hand" as it gave Capellini, president elect of District No. 1 and reputed radical.

An increase of 20 per cent in contract wages, a $2 daily increase for day laborers, uniformity and equalization of all day rates, a uniform eight-hour day and the weighing of coal in computing pay are some of the demands adopted by the anthracite mine workers at the convention held in Scranton June 26 to 29. These demands will be presented to the anthracite operators as soon after July 4 as possible, according to John L. Lewis, International president of the United Mine Workers of America, who presided over the convention the last two days.

The meeting was composed of over 500 delegates representing the workers in Districts 1, 7 and 9 and was held in Town Hall, the demands being adopted at the afternoon session of June 29.

The morning session of June 29 was enlivened by the presence of two men and a woman, alleged Communists. They were ordered to leave the hall and later were attacked and beaten in the Court House Square.

No action was taken regarding the continuation of work after Aug. 31, when the present agreement expires.

"The United Mine Workers of America are not approaching the coming negotiations with the anthracite operators in a spirit of apprehension," declared President John L. Lewis, at his first appearance on the convention floor on June 29. "We are not approaching those wage negotiations with any desire to bring about a suspension of coal production in the anthracite fields. None more than we appreciate the many grave responsibilities which will devolve upon the shoulders of the representatives of the Mine Workers and the operators in the conferences to come, and none more than we recognize the paramount interest of the American people in having effectuated, if possible, a satisfactory wage adjustment in order that these mines may continue to produce coal uninterruptedly."

Concluding, Mr. Lewis said: "The President of the United States last week addressed a letter to the U. S. Coal Commission bearing upon the anthracite situation and asking the Coal Commission to exercise its good offices in expediting matters. There can be no criticism of the President's action in the premises. He was merely articulating a point of view held by a great many people who suffered great inconvenience during the year past.

"The U. S. Coal Commission since the receipt of the letter from the President have addressed a communication through its chairman to Chairman Kennedy of the Tri-District convention. The letter has arrived this morning and I think it opportune at this moment, in closing my remarks, to call upon President Kennedy to read to the convention the letter of the Coal Commission and have it spread upon our records."

The letter from Mr. Hammond follows:

"On Jan. 11, pending negotiations between the operators and the bituminous miners on a new contract, this commission approached both sides, urging an agreement that would continue mining operations. It received assurances of support from both sides to the suggestion that by mutual cooperation an understanding should be reached that would protect the interest of each and at the same time save the public from the disaster of a suspension of mine operations.

"We now address you in the same spirit as regards the necessity for the same co-operation in the settlement of the details of a new contract in the anthracite fields, the present contract expiring Aug. 31.

"This commission hopes that the prompt and satisfactory response received to its suggestions in the matter of the bituminous contract will be repeated in the negotiations about to be undertaken in the making of an anthracite contract. The public expects an agreement, and we have full confidence that both operators and miners will recognize their duty to the public and will be able to effect a speedy conclusion.

"You will receive within a few days the commission's report upon the anthracite industry. In the meantime we urge upon both sides that, in addition to the welfare of each, that of the great body politic of the American people is involved, and that public sentiment will not tolerate a suspension of its anthracite coal supply with the beginning of the fall and winter season.

"As the present contract provides 'the continuance of production after Aug. 31, 1923, shall be upon such terms as the parties may agree upon in the light of the report of the commission,' the commission confidently expects that all questions will be left open for consideration of the Joint Scale Committee."

Notable Attendance of Young Men

The convention opened on the morning of June 26 and Thomas Kennedy, president of District No. 7, was chosen temporary chairman. A noticeable feature was the presence among the 500 delegates of a large number of young men, which was generally commented on. Heretofore the majority of delegates have been men of middle age.

Mayor John H. Durkan welcomed the delegates. An effort was made early in the meeting to have Rinaldo Capellini, according to the unofficial returns the newly elected president of District No. 1, address the convention. Chairman Kennedy overruled the motion at that time but later in the day Mr. Capellini made a speech in which he said he stood for 100 per cent unity, 100 per cent effort to obtain better wages and 100 per cent brotherliness and love.

During the first day's sessions Chairman Kennedy appointed the scale committee, the committee on resolutions and the committee on rules. Capellini made a request that inasmuch as the newly elected officers of District No. 1 would be in office after the new wage agreement had been signed it would only be fair to allow them to sit in while the conference committee discussed the demands to be presented. Late on June 29 President Lewis announced that Capellini would be on the sub-committee that will confer with the operators.

At the session on June 27 Chairman Kennedy took up the cudgel against the National Retail Coal Merchants' Association, which on the day previous had adopted a resolution urging the incorporation of all labor unions, although the resolution did not name the mine workers' organization. He declared it as the unseen hand of the anthracite operators hitting at the mine workers. Mr. Kennedy said the United Mine Workers of America is not dealing in commodities, it is not a business organization for profit and that therefore there is no necessity for incorporation.

The convention referred to President Lewis a resolution that the United Mine Workers enter into an agreement with miners of foreign countries by the terms of which a coal supply would be shut off from America in case of a miners' strike. A resolution that the convention approve the John Mitchell Insurance Co., an organization about to be formed to supply insurance to mine workers at a reduced premium, was adopted. It was explained that the company was in no way affiliated with the miners' organization and that it will be a private enterprise catering to miners.

The demands which were adopted by the convention follow in full:

(1) That the next contract be for a period of two years with complete recognition of the United Mine Workers of America, Districts 1, 7 and 9.

(2) That the contract wage scales shall be increased 20 per cent; all day men shall be granted an increase of $2 per day; that the contract laborers increase now being paid by the operators shall be added to the contract rates; that the differential in cents per day between classifications of labor previous to the award of the U. S. Anthracite Coal Commission shall be restored.

(3) Uniformity and equalization of all day rates and that skilled mechanics, such as carpenters, blacksmiths, etc., shall be paid the recognized standard rates existing in the region, which rates should not be less than 90c. per hour as a basis and that engineers and pumpmen who do repair work on their engines and pumps shall be paid the mechanics' rate quoted herein for this repair work; and that all day men shall be paid time and one-half for over time and double time for Sundays and holidays.

(4) That the provisions of the eight-hour clause in the present agreement shall be applied to all persons working in or around the anthracite collieries coming under the jurisdiction of the U. M. W. of A., regardless of occupations, and that in the bringing of these employees under the eight-hour day their basis shall be arrived at in the same manner as the basis was arrived at in the case of pumpmen and engineers, plus the increase demanded in Sec. 2 of this document; and further, that inside day labor shall work on the basis of straight eight hours underground.

(5) That where coal is paid for by the car it shall be changed and payment shall be made on the ton basis of 2240 lb. where dockage and penalties are now imposed for refuse, that the amount of such refuse to be permitted in any car shall be fixed by the mine committee and colliery officials in conformity with the agreement and that the present unreasonable penalties and dockage shall be abolished.

(6) A more liberal and satisfactory clause in the agreement covering the question of miners who encounter abnormal conditions in their working places, and that to correct this situation the following quotation: "Unless otherwise directed by the foreman." shall be stricken from the agreement covering this particular subject and that the consideration rate of each colliery should be equivalent to the average daily earnings of contract miners under normal conditions and that for dead work performed by the contract miner he shall be paid this consideration rate.

(7) Payment for all sheet iron, props, timber, forepolling, extra and abnormal shoveling, where such is not now paid for, and that jackhammers shall be supplied to miners free of charge and that company workers shall be supplied with tools free of charge.

(8) That a uniform rate of 20c. per inch be paid for refuse in all kinds of mining up to ten feet wide, and that the rate for blasting top and bottom rock shall not be less than 30c. per inch with the understanding that there rates are to be the minimum, not affecting higher rates that exist.

(9) That after a grievance has been disposed of by the Conciliation Board and referred to the umpire that the umpire shall likewise render his decision within thirty days, said decision to be based upon equity if requested by complainant.

(10) That the wage schedules be brought up to date, containing all new rates and occupations, and that mine committees shall be authorized to meet with company officials and agree upon rates for new work, before such work is commenced, and that such rates shall be added to the rate sheet and complete copies shall be supplied the committees and filed with the Board of Conciliation. The foregoing section to likewise apply to new rates for pillar work.

(11) That employees of stripping contractors be brought under the general agreement on their present basis of wages plus the increase demanded herein and that stripping locomotive engineers shall receive a rate equal to that of the shovel cranemen with extra payment for looking after their engines previous to starting time, at noon time and after quitting time; and that the shovels and boilers to be assigned watchmen shall be restricted to a certain number to be determined upon between the contractors and the committee.

We recommend that our Scale Committee use every effort to have the operators agree to some provision in the agreement regarding the price of coal and rent to be charged the employees.

Supplementary Recommendations on Policy.—The committee recommends that the scale committee to negotiate the contract shall be composed of the officers, the Executive Board members of the three districts, together with the resident International officers and three mine workers from each district affected, the district presidents to select the three mine workers in each district subject to the approval of the Executive Boards. We further recommend that this committee shall decide as to whether the report shall be submitted to the rank and file by referendum vote or to a tri-district convention, with the further understanding that copies of the report of the scale committee shall be forwarded to all local unions in sufficient time for their information, previous to the referendum vote or the convention. We further recommend that the unofficially elected new officers in District 1 shall be permitted to become members of the scale committee from the start of the negotiations, subject to approval of the regular biennial convention of District 1. This recommendation is made without prejudice to any controversy that might arise concerning the election for officers of District 1.

Wage Parley at Atlantic City, July 6

Officials of the United Mine Workers will present to mine owners at Atlantic City, July 6, the demand for anthracite wage increases drawn up by the workers at Scranton, Pa., last week. Besides John L. Lewis, president, and other officials of the International union, the sessions will be attended by the three presidents of the anthracite district and most of the Miners' Scale Committee. S. D. Warriner of Philadelphia, is expected to head a delegation of eight of the principal coal prroducers.

Army Seeks Coal Bids for Midwest Posts

The Quartermaster Corps of the army has called for bids on coal for various government posts to be opened at the Chicago Depot, July 17, at 11 a.m., as follows: Fort Benjamin Harrison, Indiana, 8,000 tons; Fort Brady, Michigan, 1,650 tons; Chanute Field, Illinois, 2,100 tons; Fort Cook, Nebraska, 3,150 tons; Fort Wayne, Michigan, 1,200 tons; Camp Custer, Michigan, 1,200 tons; Fort Des Moines, Iowa, 4,800 tons; Erie Proving Grounds, Ohio, 1,250 tons; Fairfield Air Depot, Ohio, 4,600 tons; Fort Hayes, Ohio, 3,700 tons; Jefferson Barracks, Missouri, 5,500 tons; Fort Leavenworth, Kansas, 35,000 tons; Camp Knox, Kentucky, 1,000 tons; Little Rock Depot, Arkansas, 150 tons; McCook Field, Ohio, 4,500 tons; Fort Omaha, Nebraska, 400 tons; Fort Riley, Kansas, 14,000 tons; Fort Robinson, Nebraska, 1,500 tons; Rock Island Arsenal, 800 tons; Scott Field, Illinois, 3,600 tons; Fort Snelling, Minnesota, 6,000 tons; Selfridge Field, Michigan, 5,900 tons; Fort Sheridan, Illinois, 6,000 tons; Fort Thomas, Kentucky, 2,800 tons. In addition bids are asked for small quantities of anthracite at a large number of Middle Western army posts.

Class 1 Railroads Consume 9,373,000 Tons Of Coal in April at $3.56 per Ton

Class 1 railroads of the United States consumed 9,373,000 net tons of coal during April, 1923, as charged to account 394, compared with 14,340,000 tons during the preceding month and 6,856,000 tons in April, 1922, according to a recent report of the Bureau of Statistics of the Interstate Commerce Commission covering 176 steam roads. During the first four months of 1923 these roads consumed 39,530,000 tons as compared with 31,361,000 tons during the corresponding period of 1922. The delivered cost per ton in April last was $3.56 compared with $3.45 for the corresponding month of last year.

Consumption of fuel oil during April totaled 147,694,000 gallons compared with 155,949,000 gallons in March and 116,364,000 gallons in April, 1922. The totals for the first four months of 1923 and 1922 were 589,498,000 and 474,927,000 gallons respectively.

THE TROUBLE SEEMS TO BE that Mexico can't get along without American capital and can't get along with it.—*Passaic News.*

Coal Commission Postpones Submission of Report Until July 9; Government Developing Coal Sense

By Paul Wooton
Washington Correspondent of *Coal Age*

So as to make possible a stronger and a more comprehensive report, the President's Coal Commission has sacrificed compliance with the literal date set for its special anthracite findings and probably will release it for publication on July 9 instead of July 2, as had been planned. The report is expected to be in final form on July 4, but to insure a maximum amount of publicity it must be delivered in advance to the press so that copies may be mailed to publications for use on July 9.

While one of the causes of delay is the late receipt from certain companies of essential data, Chairman Hammond and Commissioner Smith made it clear in their statement to the press that the delay is in no way chargeable to dilatoriness on the part of those making returns. The task in some instances was greater than could be accomplished within the time limit. Some delay is chargeable to compilation and the commissioners themselves must have some time to digest and interpret the recapitulation which has been made.

In some quarters the delay in the issuance of the report is regarded as serious. This is based on the fact that it cuts down the time during which it could be considered by those engaged in the anthracite wage negotiations. Had the report been available promptly on July 1 it would have strengthened the position of the conservative leaders at Scranton, some contend. There is general feeling of regret that it did not come through on scheduled time. The plain terms of the law are that the report should be made on or before July 1. The fact that this was not done is certain to result in criticism. This is particularly the case since those engaged in the anthracite negotiations were keyed up to expect the report on July 1.

Stress Bearing on Anthracite Wage Negotiations

The commission undoubtedly owes its existence to the anthracite situation. Had that not become acute at the time the legislation was under consideration the bill probably would not have passed. This is given as an additional reason why nothing should have been allowed to prevent the report coming out so as to give the maximum amount of time for its consideration at this particular stage of the wage negotiations.

The position of the commission apparently is that it is better to sacrifice a few days and have a much better report, one which will be of more service during the wage negotiations than would have been the case had it been issued with the material at hand on July 1. To issue the report on July 1 would have meant its completion on June 28 or 29 so as to provide the time necessary for publication release. As it is, the commission is keeping in particularly close touch with the situation in the anthracite region, where Judge Daniel M. Link, of Indiana, is acting as observer for the commission.

Judge Link was described at the commission as a man with eyes and ears and good judgment. Chairman Hammond, acting for the commission, addressed a letter to the officers and delegates at the Tri-district anthracite mine workers' convention at Scranton urging them not to bind their scale committee but to leave all questions open to consideration by the joint scale committee.

The extent to which the Attorney General may have been guided in dismissing the Indianapolis indictments by the recommendations of the Coal Commission is not known, but it is certain that the commission is very much of the opinion that nothing constructive could have been obtained from pressing that action and that its discontinuance would be in the public interest.

The fact that the Attorney General took counsel with the Coal Commission before action in that case and the fact that he dismissed the indictments is regarded as evidence that the government is displaying more practical sense than ever before in the handling of coal problems. The existence of these indictments was one of the great impediments to settlement last summer, as it was the most valuable card in the hands of the diehards among the operators.

Ever since those indictments were brought it has been generally believed that they were ill conceived. Had they been pushed it would have thrown the industry into complete chaos. Judge Anderson is perhaps the only federal judge who would have taken them seriously. It has become increasingly clear, many contend, that large blocks of tonnage must be represented in any agreement when the coal from six states compete in a single city. It called for an interstate agreement, but along came the Attorney General of the United States professing to see restraint of trade in the well-established processes of collective bargaining.

The dismissal of the suit not only indicates that there is to be more sanity on the part of the Federal Government in the handling of coal problems but it emphasizes the conspicuous failures which have followed the efforts to deal legalistically with coal problems. It emphasizes the advantages of placing such matters on a plane of human understanding rather than on one of court procedure. The check-off and other indictments have been singularly barren of results, particularly when compared with the real results which followed Mr. Hoover's voluntary program, which prevented a runaway market when there was not a vestige of law to strengthen his arm.

The President's speech at Cheyenne and the assigned-car decision are other signs that federal authorities are becoming educated in coal. The experience here during the last strike and the results in the Ruhr demonstrate beyond peradventure that coal cannot be mined with troops. The problems which confront the industry are myriad, but the Coal Commission is fully expected to urge a code of conduct which will take these disputes out of the realm of hostility into one of sane and practical negotiation.

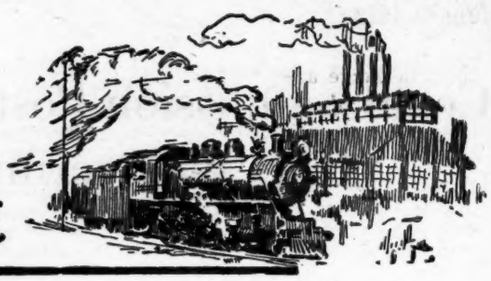
During last week the commission conferred with a committee from the Massachusetts Legislature. The committee was composed of Senators and Representatives. John W. Haigis was its chairman. The committee discussed the anthracite situation in its relationship to New England.

Trade Commission Puts in More Evidence To Prove Charge Against Dock Men

The second week's hearing in St. Paul of the Federal Trade Commission's charges against the Northwest Dock Operators' Association continued to bring forth evidence tending to show that the dock association worked to eliminate independent coal concerns by refusing to make contracts with them and by making discriminating prices against them, also by attempts to bring about monopolistic control of the trade of this district. What is assumed to be an admission of similar position under the law is presented in the immediate withdrawal of the Pittsburgh Coal Co. from the association upon the Supreme Court decision that the hardwood lumber association was a conspiracy.

Evidence has been presented to prove that association members refrained from bidding direct on municipal steam business requiring team delivery in competition with the local retail dealer, and that they refrained from approving contracts with dealers except where the contract covered a public utility with a definite tonnage covered by contract between the utility and the dealer. About 1,000 or more documents are to be introduced in evidence by the prosecution. The defense professes to be quite secure in the propriety of its answer, and expects to offer complete and adequate explanations which will justify all actions that are admitted, and denies that any illegal methods or policies have been pursued.

Production and the Market



Weekly Review

The coal trade is fast losing its fear of a suspension of anthracite mining on Sept. 1, and soft-coal prices in the East are being dragged downward as this belief grows. It is generally conceded that if the anthracite operators and mine workers should announce the signing of a contract there would be an immediate slump in the demand for domestic anthracite and independent prices would drop from their $11 peak to company circular.

Soft-coal trade as a whole has settled down to a normal summer grind differing only from pre-war conditions in that a much larger proportion of the coal is now going forward on spot purchases and the railroads and large industrials are accumulating stocks.

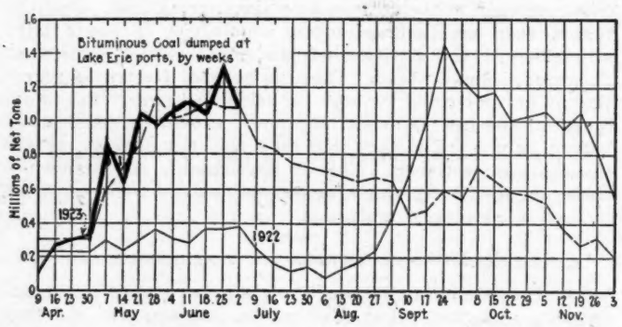
Prices Show Downward Tendency

Prices are uneven and the general tendency downward. *Coal Age* Index declined two points last week to 203 on July 2, corresponding to an average price at the mines of $2.46 per net ton. Quotations for Clearfield, Cambria, Somerset, Pittsburgh and Mount Olive district coals show no change from last week, but there were declines in Pocahontas, Pittsburgh No. 8, southern Illinois and eastern Kentucky coals and advances in Kanawha, Hocking and western Kentucky.

Production of soft coal is declining at about the same rate as prices. The estimated output in the third week of June was 10,411,000, with a decline indicated in the last week of the month. The output for the first half of the year was about 273,000,000 net tons, which is above the average of the same period of the three most prosperous years of recent times.

The feature of the week is the showing in the government statistics of coal exports in May of the large tonnages taken by Europe. More than 481,000 gross tons of bituminous coal cleared from ports of the United States for Europe in May. Of this 238,427, or nearly half, was destined for France, Italy received some 57,000 tons and The Netherlands 43,000 tons. The movement to South America was brisker in May than a year ago, partly because of the strike here last year and partly because England has not been able to meet market demands of her foreign customers. Federal Fuel Distributor Wadleigh will release a summary of the export situation the end of this week, to which will be added expressions of opinion from some of the leading American and British exporters.

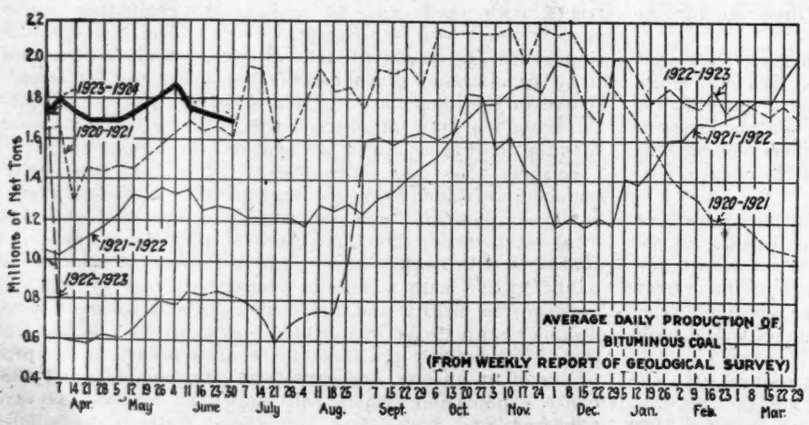
Buying in the Middle West is at low ebb. There is no demand and storing by large consumers has almost ceased. Curtailing of production by industries, particularly the textiles, in New England, has put a damper on business there. Receipts have diminished and new



business is scarcely heard of. In Pittsburgh the market is easier than a week ago. More mines are closing each week.

Lake dumpings continue heavy. Receipts at Milwaukee are so heavy and shipments so light that the docks will soon have received about 50 per cent of last year's season's total.

Dumpings at Hampton Roads for the week ended June 28 for all accounts were 355,961 net tons, as compared with 265,060 net tons the previous week. The feature of the Hampton Roads situation at the end of last week



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
June 9	5,136,000	10,676,000
June 16 (*b*)	5,013,000	10,575,000
June 23 (*a*)	5,363,000	10,411,000
Daily average	894,000	1,735,000
Calendar year	182,624,000	262,903,000
Daily av. cal. year	1,230,000	1,775,000
ANTHRACITE		
June 9	13,000	2,046,000
June 16	22,000	2,053,000
June 23	24,000	2,042,000
Calendar year	21,901,000	49,287,000
COKE		
June 16 (*b*)	106,000	407,000
June 23 (*a*)	110,000	413,000
Calendar year	3,103,000	9,672,000

(*a*) Subject to revision. (*b*) Revised from last report.

was the large accumulation and the scarcity of tonnage awaiting coal.

Production of beehive coke increased during the third week of June, the total output being estimated at 413,000 net tons, an increase over the revised figure of the preceding week of 6,000 tons. Cumulative output during the year to date is 9,672,000 net tons.

Little Doing in Chicago

Trade continues flat in Chicago. There is no demand for anything. The few railroads and other large consumers who are storing have begun to ease a little, thus choking down about the only important outlet the producers of the Middle West have had for lump, egg and nut coals. Retail call amounts to nothing and is not expected to make itself felt for some time. Not only were Illinois prices not advanced July 1, as they were June 1, but it is a lucky producer indeed who manages to get the circular price. Screenings are the bane of the Middle West's life just now. Good Franklin County coal below nut size sells now for $1.50 on this market. Smokeless and anthracite reach Chicago in small but steady volume and are moving into consumers' cellars with a shade more celerity than is usual at this slack time of year, because of impending labor troubles in the anthracite fields.

Midwest Fields Full of "No Bills"

Southern Illinois mines are working two and three days per week, with "no bills" being carried everywhere. What little demand there is seems to be largely for lump, the "no bills" being carried largely in the egg, nut and steam sizes. Though the circular price is $4.35 some of the larger producing companies are offering 6-in. lump at $3.85, egg at $3.85 and nut at $3, while independents are offering lump at $3.25, egg at $3, and nut at $2.50, with mine-run ranging between $2.25 and $2.50 and screenings being offered freely at $1.50.

In Jackson and Perry counties better working time has been experienced by some of the operators in this district who have been successful in obtaining railroad storage orders. In the Standard field coal is actually being sold at less than cost, 6-in. lump being offered at $2.25 per ton, 2-in. lump at $2, steam, nut and egg $1.75 per ton and screenings $1.15@$1.25.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

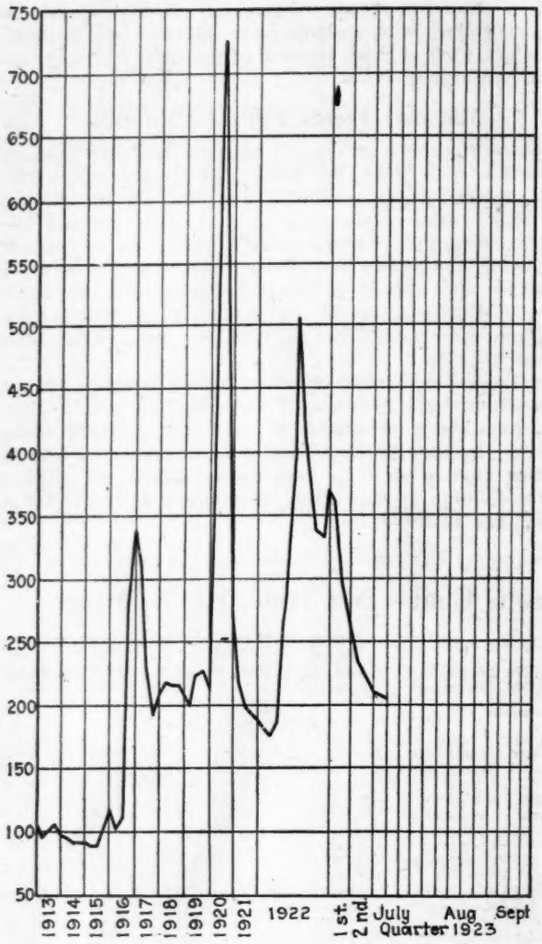
Low-Volatile, Eastern	Market Quoted	July 3 1922	June 18 1923	June 23 1923	July 2 1923†
Smokeless lump	Columbus	$3.65	$6.25	$6.10	*$5.75@$6.00*
Smokeless mine run	Columbus	3.45	3.90	3.60	3.50@ 3.75
Smokeless screenings	Columbus	3.25	3.60	3.60	*3.25@ 3.50*
Smokeless lump	Chicago	3.65	6.10	6.10	6.00@ 6.25
Smokeless mine run	Chicago	3.40	3.85	3.85	*3.50@ 4.00*
Smokeless lump	Cincinnati	3.75	6.35	6.00	**6.00@ 6.50**
Smokeless mine run	Cincinnati	3.45	4.25	3.50	*3.00@ 3.75*
Smokeless screenings	Cincinnati	3.25	4.10	3.25	*2.50@ 3.50*
*Smokeless mine run	Boston	6.20	5.85	5.60	5.50@ 5.75
Clearfield mine run	Boston	3.45	2.35	2.35	2.00@ 2.75
Cambria mine run	Boston	3.70	3.00	2.85	2.50@ 3.25
Somerset mine run	Boston	3.50	2.75	2.60	2.25@ 3.00
Pool 1 (Navy Standard)	New York	4.80	3.75	3.75	*3.50@ 3.75*
Pool 1 (Navy Standard)	Philadelphia	.....	3.65	3.65	*3.25@ 3.95*
Pool 1 (Navy Standard)	Baltimore	4.25	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.65	2.75	2.75	**2.65@ 3.00**
Pool 9 (Super. Low Vol.)	Philadelphia	4.55	2.75	2.85	*2.45@ 3.20*
Pool 9 (Super. Low Vol.)	Baltimore	4.00	2.80	2.75	*2.50@ 2.75*
Pool 10 (H.Gr.Low Vol.)	New York	4.40	2.35	2.50	*2.35@ 2.60*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	4.25	2.20	2.25	*2.05@ 2.35*
Pool 10 (H.Gr.Low Vol.)	Baltimore	4.00	2.45	2.45	*2.15@ 2.35*
Pool 11 (Low Vol.)	New York	4.15	2.00	1.95	**1.90@ 2.20**
Pool 11 (Low Vol.)	Philadelphia	3.90	1.90	1.90	*1.70@ 2.00*
Pool 11 (Low Vol.)	Baltimore	3.90	2.25	2.25	*2.00@ 2.10*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	4.25	1.80	1.80	1.60@ 2.00
Pool 54-64 (Gas and St.)	Philadelphia	.....	1.80	1.70	*1.45@ 1.80*
Pool 54-64 (Gas and St.)	Baltimore	3.90	1.75	1.75	1.75
Pittsburgh sc'd gas	Pittsburgh	.....	2.80	2.80	2.75@ 2.90
Pittsburgh mine run (St.)	Pittsburgh	.....	2.05	2.05	2.00@ 2.10
Pittsburgh slack (Gas)	Pittsburgh	.....	1.50	1.50	1.50
Kanawha lump	Columbus	3.65	2.80	3.00	2.75@ 3.25
Kanawha mine run	Columbus	3.40	2.05	1.85	1.75@ 2.00
Kanawha screenings	Columbus	3.15	1.45	1.35	*1.15@ 1.35*
W. Va. lump	Cincinnati	3.65	3.60	3.25	**3.00@ 4.00**
W. Va. Gas mine run	Cincinnati	3.65	1.75	1.75	**1.75@ 2.00**
W. Va. Steam mine run	Cincinnati	3.45	1.75	1.75	**1.75@ 2.00**
W. Va. screenings	Cincinnati	3.25	1.25	1.10	**1.00@ 1.50**
Hocking lump	Columbus	3.65	2.75	2.75	2.50@ 3.00
Hocking mine run	Columbus	3.40	1.90	1.85	1.75@ 2.00
Hocking screenings	Columbus	3.10	1.20	1.20	*1.20@ 1.30*
Pitts. No. 8 lump	Cleveland	4.25	2.75	2.70	*2.10@ 3.00*
Pitts. No. 8 mine run	Cleveland	4.00	1.90	1.90	**1.90@$2.00**
Pitts. No. 8 screenings	Cleveland	4.00	1.20	1.25	1.20@ 1.30
Midwest					
Franklin, Ill. lump	Chicago	.....	4.05	4.05	*3.50@ 4.35*
Franklin, Ill. mine run	Chicago	.....	3.10	3.10	*2.75@ 3.25*
Franklin, Ill. screenings	Chicago	.....	1.80	1.80	*1.50@ 1.85*
Central, Ill. lump	Chicago	.....	2.60	2.60	2.50@ 2.75
Central, Ill. mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	.....	1.60	1.60	*1.25@ 1.50*
Ind. 4th Vein lump	Chicago	.....	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	.....	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	.....	1.80	1.80	*1.50@ 1.75*
Ind. 5th Vein lump	Chicago	.....	2.85	2.85	2.75@ 3.00
Ind. 5th Vein mine run	Chicago	.....	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	.....	1.55	1.55	*1.40@ 1.50*
Standard lump	St. Louis	.....	2.35	2.25	2.25
Standard mine run	St. Louis	.....	1.80	1.75	1.75
Standard screenings	St. Louis	.....	1.50	1.35	*1.15@ 1.25*
West Ky. lump	Louisville	4.40	2.25	2.25	2.15@ 2.35
West Ky. mine run	Louisville	4.40	1.75	1.75	1.65@ 1.85
West Ky. screenings	Louisville	4.40	1.35	1.15	1.10@ 1.30
West Ky. lump	Chicago	4.45	2.35	2.35	2.25@ 2.55
West Ky. mine run	Chicago	4.45	1.45	1.45	*1.10@ 1.25*
South and Southwest					
Big Seam lump	Birmingham	2.35	3.05	3.05	2.90@ 3.20
Big Seam mine run	Birmingham	2.15	2.05	2.05	1.85@ 2.25
Big Seam (washed)	Birmingham	2.15	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	3.65	3.25	3.25	3.00@ 3.50
S. E. Ky. mine run	Chicago	3.40	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Louisville	3.75	3.50	3.35	*3.00@ 3.50*
S. E. Ky. mine run	Louisville	3.50	2.10	2.10	*1.75@ 2.25*
S. E. Ky. screenings	Louisville	3.50	1.35	1.35	*1.00@ 1.50*
S. E. Ky. lump	Cincinnati	3.70	3.60	3.25	*2.75@ 3.50*
S. E. Ky. mine run	Cincinnati	3.50	1.75	1.60	**1.50@ 2.00**
S. E. Ky. screenings	Cincinnati	3.20	1.35	1.10	*.75@ 1.25*
Kansas lump	Kansas City	5.00	4.00	4.00	3.50@ 4.50
Kansas mine run	Kansas City	4.25	3.25	3.25	3.00@ 3.50
Kansas screenings	Kansas City	3.05	2.60	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in heavy type, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Pre-Strike Independent	Latest Pre-Strike Company	June 25, 1923 Independent	June 25, 1923 Company	July 2, 1923† Independent	July 2, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	.....	$7.75@$8.35	.....	$7.75@$8.35
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.00@ 8.10	.....	7.00@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	$8.50@11.50	8.00@ 8.35	$8.50@11.50	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@10.50	8.10@ 8.35	9.25@10.50	8.10@ 8.35
Egg	Chicago*	5.06	7.50	8.25	7.60@10.25	7.25@ 7.45	7.60@10.25	7.25@ 7.45
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	8.50@11.50	8.00@ 8.35	8.50@11.50	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@10.00	8.15@ 8.35	9.25@10.00	8.15@ 8.35
Stove	Chicago*	5.06	7.75	8.25	7.60@10.25	7.25@ 7.45	7.60@10.25	7.25@ 7.45
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	8.50@11.00	8.00@ 8.35	8.50@11.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@10.50	8.15@ 8.35	9.25@10.50	8.15@ 8.35
Chestnut	Chicago*	5.06	7.75	8.25	7.60@10.25	7.25@ 7.45	7.60@10.25	7.25@ 7.45
Ranges	New York	2.34	.....	.....	.....	8.30	.....	8.30
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.25@ 8.00	6.00@ 6.30	7.25@ 8.00	6.00@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 7.25	6.15@ 6.20	7.00@ 7.35	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	6.25@ 7.25	5.50@ 5.65	6.25@ 7.25	5.50@ 5.65
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	2.75@ 3.50	3.50@ 4.15	2.75@ 3.50	3.50@ 4.15
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	2.75@ 3.50	3.50	2.75@ 3.50	3.50
Rice	New York	2.22	2.00@ 2.50	2.50	2.00@ 2.50	2.50	2.00@ 2.50	2.50
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	1.75@ 2.50	2.50	1.75@ 2.50	2.50
Barley	New York	2.22	1.50@ 1.85	1.50	1.25@ 1.50	1.50	1.25@ 1.50	1.50
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.15@ 1.50	1.50	1.15@ 1.50	1.50
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	1.60	.....	1.60

*Net tons, f.o.b. mines †Advances over previous week shown in heavy type, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923		1922	
	July 2	June 25	June 18	July 3
Index	203	205	210	290
Weighted average price	$2.46	$2.48	$2.54	$3.51

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

St. Louis

Domestic demand still quiet, brought about largely by the fact that there will be no increase in the price effective July 1. Dealers do not expect any increase in business before the middle or latter part of July. There is only a fair demand for anthracite in spite of the fact that Western shipments have been temporarily curtailed. Coke, while not plentiful, is easier and the demand has been better on account of the contemplated increase of 25c. per ton effective July 1.

Western Kentucky Screenings Advance

The general demand in the western Kentucky field is unsteady, operations being controlled by the activity of their selling organizations. Mines producing only mine-run are out of the running. Prices are generally firm all along the line in spite of lack of orders for prepared coal during the last few days. This has caused a slight slump in production of screenings. At the same time there probably has been a little better steam demand due to reduction of storage stocks, and screenings have advanced from $1 a ton last week to $1.25 now, with some houses quoting $1.35. Mines haven't much business ahead as a rule and are operating on day-to-day orders, with frequent closedowns.

Eastern Kentucky Is Weaker

Eastern Kentucky coal is reported as somewhat weaker all along the line, slight breaks having been reported in egg and lump sizes, but block is firm. Mine-run is unchanged, but screenings weakened a little, as production of prepared has been quite fair, especially on movement to the Lakes in spite of the L. & M. embargo, and to the north and west. Car supply is excellent.

It is reported that an immediate delivery contract of 15,000 tons of Hazard screenings was taken at $1 a ton during the week, but that the contract for the Cincinnati Water Works annual supply was taken on the basis of $2.50 a ton.

At Kansas City the retail price of Arkansas semi-anthracite advanced another 50c. on July 1. This is the second 50c. increase since the slash of early spring, made in an effort to encourage summer buying and storage. So far the advances have not forced the domestic market. Operators, jobbers, wholesalers and retailers under the title of "The Associated Coal Bureau of Kansas City" by an intensive advertising campaign are trying to educate the public in the hazards of the coal business and the factors that determine the price of coal. The campaign has not been on long enough for results yet to be noticeable.

Utah weather is really hot now and dealers are doing very little business. The slack market is very soft at $1.75. It will improve as soon as the sugar companies begin buying heavily. The coast business is fair. Lump and intermediate sizes are in demand there as well as locally.

Early Improvement Improbable in Ohio

The Cincinnati market is sluggish and refuses to respond even to drastic cuts made on lower grades of slack. West Virginia 2-in. lump was quoted $2.50@$2.75 on July 2, as compared with $2.75@$3 the previous week, and southeastern Kentucky 2-in. lump at $2.50@$2.75 as compared with $2.50@$3 the week previous. There was little change in the Columbus and central Ohio situation. Buying is at low ebb and there are no immediate prospects of improvement. Steam trade is quiet and there is no disposition on the part of steam coal users to stock up. The best customers are the utilities and railroads although some tonnage is being taken by industries. The domestic trade is quiet, many householders believing that prices are going to be lower. Output in the Hocking Valley, Pomeroy and Crooksville district is around 25 per cent. At Cleveland the market is dull and operators say that while they are receiving some inquiries, little improvement is looked for in the immediate future.

Conditions at Pittsburgh are a trifle easier than a week ago. Demand in the open market is poor. The market at Buffalo continues inactive with a good-sized tonnage on the tracks unsold.

Car supply on the Chesapeake & Ohio, Virginian, Norfolk & Western and the Baltimore & Ohio in West Virginia shows some improvement, but is not giving producers as much concern as lack of orders. Additional high-volatile mines in West Virginia suspended operations late in June rather than sell their product at a loss.

New England Market Turns for Worse

In New England the current market has gone from bad to worse. Receipts have diminished, and there is almost an utter lack of new business. Industrial plants have curtailed in many directions and a surprisingly large number of textile mills have shut down for periods over the holiday. Buyers have little interest in the spot market except as their curiosity is piqued by quotations at new low levels. For the average sales agency the present state of trade here holds little encouragement for July and August, although there are those who are still predicting serious transportation difficulties in the autumn.

Central Pennsylvania coal quotations have changed very little. Most operators feel it better to shut down than sell at less than cost. A few of the higher grades are commanding about the same range of price that has obtained for the past sixty days, but even producers of these con-

cede that buying power has practically disappeared from the market.

Pocahontas and New River share the general depression. Accumulations continue heavy at Hampton Roads and prices the past week have shut off from $5.50 to $5.10 on second grades, with No. 1 Navy standard coals at only 25 to 35c. more. For distribution inland from Boston, Providence and Portland on car prices also slumped, $7 to $7.25 being the asking figure. No orders of any volume have materialized either f.o.b. or at this end, and there is a feeling that the new demurrage tax which goes into effect July 1 will tend to curtail shipments to the piers.

From Philadelphia as well as from Norfolk and Newport News the number of loadings recently has been notably less. Transportation continues in ample supply and today there seems no anxiety about coal coming forward in volume sufficient for all possible needs.

Seaboard Market Shows Little Life

Along the seaboard the market is quiet. At New York the daily number of cars at the terminals averages about 1,900, a slight increase over the previous week. Demand continues quiet. The Phiadelphia market shows no added strength. There is a feeling that the railroads will come into the market soon. There are some bright spots in the market at Baltimore and some of the better grades, such as Pools 71 and 9, are hard to pick up at times. Despite this there is no real upward tendency with regard to prices.

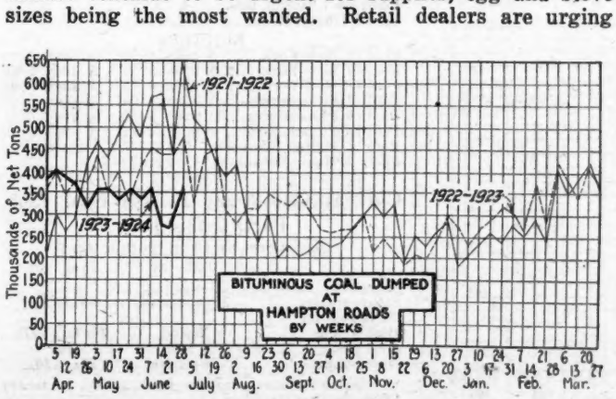
Dullness prevades the Birmingham market. Demand for steam coal is poor, while inquiry for the lower grades of lump and other domestic coals is easier. Regardless of the fact that there is scarcely any market for commercial coal and this class of mines is operating only about half time, production for the week ended June 16 was 359,000 tons. Mine labor is becoming scarce in some sections on account of the exodus of negroes to the North and West.

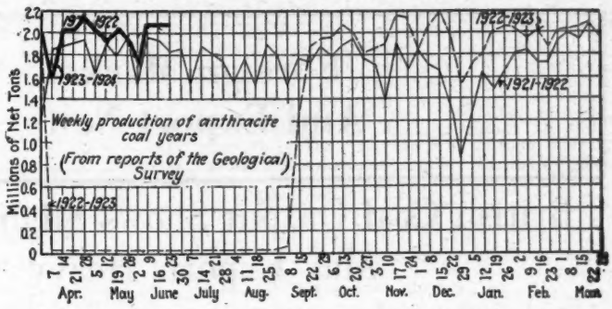
Heavy Dock Receipts at Duluth

The second largest week as far as dock coal receipts are concerned was scored at Duluth last week when sixty-four cargoes arrived, five of which were hard coal. Thirty-four others are reported on way, four of which are anthracite. It is estimated there are about 2,500,000 tons of bituminous and 150,000 tons of anthracite on the docks. Receipts at Milwaukee so far this season amount to about 1,329,870 tons of all coals, or about 50 per cent of last year's season total. There is much less buying of lake coal in the Pittsburgh district. Shipments of anthracite from Buffalo for the week were reported at 139,000 net tons, of which 59,000 tons were for Duluth and Superior, 43,700 tons for Chicago, 33,700 tons for Milwaukee, 1,400 tons for Sheboygan and 1,200 tons for Kenosha. Lake Erie dumpings during the week ended July 2 was 1,034,908 net tons of cargo coal and 57,239 tons of fuel coal, making the total dumpings this season 10,345,147 tons.

Anthracite Market Fails to Speed Up

The anthracite market fails to show any increased activity notwithstanding that the demands to be made on the operators by their employees have been announced. Consumers continue to be urgent for supplies, egg and stove sizes being the most wanted. Retail dealers are urging





shippers for deliveries. The steam coals are not moving easily. Some companies continue to store large tonnages, which enables the independent operators to dispose of their product easier.

"There was no slackening in the rate of anthracite production during the third week of June," says the Geological Survey, "and production again passed the 2,000,000-ton mark. According to reports from the principal anthracite-carrying railroads, 39,055 cars were loaded, and on this basis it is estimated that the total output, including mine fuel, local sales, and the product of dredges and washeries, was 2,042,600 net tons.

"The cumulative output during the present calendar year to date stands at 49,287,000 tons and compares favorably with the output in the years of great activity in anthracite mining."

Slight Increase in Coke Output

Practically the entire increase of 6,000 net tons in the production of coke during the week ended June 16 over that of the preceding week occurred in Kentucky and Alabama, says the Geological Survey, where the railroads reported loadings nearly as twice as large as those of the week before. Production in all other districts except Pennsylvania and Ohio was practically the same as in the week ended June 16.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Jan. 16, 1923 Inclusive	Week Ended Jan. 16, 1923
U. S. Total	55.7	....	....	....
Somerset County	74.9	36.3	41.3	58.8
Panhandle, W. Va.	51.3	57.3	58.5	64.1
Westmoreland	58.8	65.8	60.1	76.0
Virginia	59.9	55.7	58.6	65.4
Harlan	54.8	22.1	23.1	37.0
Hazard	58.4	16.4	27.6	34.5
Pocahontas	60.0	36.6	40.6	48.8
Tug River	63.7	28.8	39.5	55.4
Logan	61.1	26.2	33.1	39.9
Cumberland-Piedmont	50.6	31.7	52.4	69.2
Winding Gulf	64.3	30.4	37.1	39.9
Kenova-Thacker	54.3	42.4	38.2	(a)
N. E. Kentucky	47.7	28.4	31.6	42.9
New River	37.9	31.6	38.4	36.9
Oklahoma	59.6	59.1	45.7	67.7
Iowa	78.4	75.9	70.0	69.1
Ohio, Eastern	46.6	40.8	43.3	67.2
Missouri	66.8	76.3	68.6	54.4
Illinois	54.5	49.9	41.8	32.9
Kansas	54.9	55.9	48.1	56.1
Indiana	53.8	37.7	46.4	39.7
Pittsburgh†	39.8	41.2	44.5	64.1
Central Pennsylvania	50.2	53.4	52.0	62.5
Fairmont	44.0	35.5	45.8	59.6
Western Kentucky	37.7	32.4	31.6	30.7
Pittsburgh*	31.9	56.1	67.4	75.3
Kanawha	13.0	15.6	25.8	41.3
Ohio, Southern	24.3	38.1	30.8	29.2

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended June 16, 1923	1,007,253	187,009
Previous week	1,013,249	190,149
Same week in 1922	848,657	91,177

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
June 14, 1923	51,988	3,129	12,787	9,257
Same date in 1922	268,863	171,832	....	....
June 7, 1923	41,106	3,528	12,978	8,926

Foreign Market And Export News

British Coal Output Shows Slight Decline; May Exports Heavy

Great Britain's coal output for the week ended June 16 was 5,651,000 tons, says a cable to *Coal Age*. This compares with 5,654,000 tons the preceding week, a decrease of 3,000 tons.

The Welsh coal trade is quiet, due to the fact that the European demand has returned to something like normal. On the other hand the operators have plenty of orders in hand and are showing no anxiety. Exports to South America are particularly good. A new feature is the circulation of inquiries from Australia, on account of the labor troubles in that country. The introduction of the third shift at the docks has resulted in a much better clearance of coal, and ships are being got away on time.

With the exception of the gas coals section, the market in the north of England is particularly quiet. The European buyers are sitting tight waiting for prices to fall. Gothenburg has taken 25,000 tons D. C. B. at 32s. 7d. c. i. f. and Belgium is inquiring for 10,000 tons of best coking coals monthly for the rest of the year.

British coal exports in May amounted to 7,684,405 tons, which was the largest tonnage of coal ever exported from Great Britain in a single month according to official statistics of the British Board of Trade received by the Bankers Trust Company, of New York, from its English Information Service. A total of 33,220,230 tons of British coal were exported in the first five months of the present year, or 3,700,000 in excess of British coal exports during the same period of 1913.

Germany continues to be a heavy purchaser of British coal.

Market Quiet at Hampton Roads

Business at Hampton Roads was unusually quiet last week, with prices continuing to break, and with a seasonable dullness pervading the situation. Bunkers, only, appeared to be holding to the average, with coastwise and foreign trade at low ebb.

Considerable foreign movement on old contracts resulted during the week, but no new orders were reported by shippers. The movement of coal to the West by rail continued to divert attention from the Norfolk & Western and Chesapeake & Ohio lines.

Although the approach to July 1 was expected to disclose a number of new inquiries for coal during the coming year, they failed to materialize. The inclination throughout the field was to depend largely upon the spot market and to take chances. The tone of the market was exceedingly weak.

United States May Coal and Coke Imports

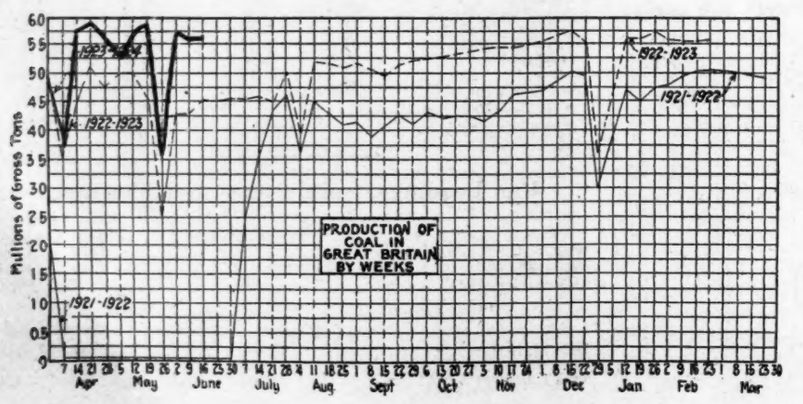
(In Gross Tons)

	1922	1923
Anthracite	484	4,981
Bituminous { free	41,654	18,438
Bituminous { dutiable	.....	53,646
Totals	42,138	77,065
Imported from:		
United Kingdom	7,663	9,595
Canada	29,136	53,646
Japan	666	6,100
Australia	4,189	1,600
Other countries	.....	1,143
Coke	3,570	6,929

United States May Exports by Custom Districts

(In Gross Tons)

	Anthracite	Bituminous	Coke
Maine and New Hampshire	849	.....	429
Vermont	.....	1,374	959
Massachusetts	.....	301	.....
St. Lawrence	146,336	279,746	2,995
Rochester	65,898	64,106	180
Buffalo	209,911	277,124	38,494
New York	6,724	1,201	1,135
Philadelphia	4,830	47,770	20,025
Maryland	.....	271,113	69,875
Virginia	.....	336,478	.....
South Carolina	.....	28,845	.....
Florida	.....	.....	264
Mobile	.....	1,000	.....
New Orleans	2	1,031	201
Sabine	.....	10	10
San Antonio	.....	445	.....
El Paso	107	2,880	1,113
Arizona	.....	4,621	8,388
Los Angeles	14	3	.....
San Francisco	.....	150	.....
Washington	1	161	.....
Alaska	1	1	.....
Dakota	99	1,840	267
Duluth and Superior	95	1,606	.....
Michigan	341	138,960	13,903
Ohio	10,605	788,235	5,011
Totals	445,813	2,249,001	163,249



United States May Coal Exports

(In Gross Tons)

	1922	1923
Anthracite	60,860	445,813
Bituminous	399,551	2,249,001
Exported to:		
France	.....	238,427
Italy	15,002	57,889
Netherlands	.....	42,788
Other Europe	.....	142,419
Canada	272,146	1,582,879
Panama	6,477	.....
Mexico	10,918	11,310
Br. West Indies	9,950	5,903
Cuba	38,020	43,608
Other West Indies	12,018	17,219
Argentina	2,291	38,130
Brazil	19,898	53,397
Chile	11,004	2,034
Egypt	.....	3,048
French Africa	.....	.....
Other countries	11,827	9,950
Coke	21,798	163,249

Export Clearances, Week Ended June 30, 1923

FROM BALTIMORE

	Net Tons
For Brazil:	
Br. SS. Promus	5,625
For France:	
Br. SS. Senator	5,182
For Germany:	
Jap. SS. Texas Maru	9,339
Nor. SS. Hanna Nielsen	7,870
Ger. SS. Hameln	5,162
For Italy:	
Br. SS. Haightown	7,704
Ital. SS. Oceania	6,323
For Spain:	
Span. SS. Anro Mendi	8,036

FROM HAMPTON ROADS

For Bahamas:	
Amer. Schr. Horace M. Bickford, for Nassau	481
For Brazil:	
Br. SS. Pentowy, for Buenos Aires	5,234
For Canada:	
Nor. SS. Ovre, for Montreal	6,817
For Cuba:	
Nor. SS. Halse, for Havana	3,284
Br. SS. Elswick Tower, for Havana	5,779
For West Indies:	
Dan. SS. Ribe, for Port au Spain	3,404
Amer. SS. Tachira, for Curacao	3,279
Nor. SS. Maud, for Kingston	1,674
Amer. Schr. Florence B. Phillips, for Sanchez	743

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.:	June 21	June 28
Cars on hand	1,132	▼ 1,051
Tons on hand	67,979	61,210
Tons dumped for week	70,795	111,278
Tonnage waiting	12,275	▼ 3,175
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,676	▼ 1,820
Tons on hand	93,570	103,530
Tons dumped for week	118,279	80,896
Tonnage waiting	19,981	▼ 16,950
C. & O. piers, Newport News:		
Cars on hand	2,465	2,564
Tons on hand	124,873	127,579
Tons dumped for week	47,587	125,648
Tonnage waiting	.....	9,090

Pier and Bunker Prices, Gross Tons

PIERS	June 23	June 30†
Pool 9, New York	$5.60@$6.00	*$5.50@$6.00*
Pool 10, New York	4.75@ 5.25	**5.00@ 5.35**
Pool 11, New York	4.00@ 4.65	**4.50@ 4.75**
Pool 9, Philadelphia	5.45@ 5.85	*5.40@ 5.80*
Pool 10, Philadelphia	4.55@ 5.35	*4.50@ 5.30*
Pool 11, Philadelphia	3.75@▼4.40	*3.70@ 4.35*
Pool 1, Hamp. Roads	5.65	*5.50*
Pools 5-6-7, Hamp. Rds.	4.75	*4.50*
Pool 2, Hamp. Roads	5.40	*5.35*
BUNKERS		
Pool 9, New York	5.90@ 6.30	*5.80@ 6.30*
Pool 10, New York	5.05@ 5.55	**5.30@ 5.65**
Pool 11, New York	4.30@ 4.95	**4.80@ 5.05**
Pool 9, Philadelphia	5.85@ 6.05	*5.80@ 6.00*
Pool 10, Philadelphia	4.85@ 5.60	*4.80@ 5.55*
Pool 11, Philadelphia	4.00@ 4.75	*3.95@ 4.70*
Pool 1, Hamp. Roads	5.75	*5.50*
Pool 2, Hamp. Roads	5.75	*5.35*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	June 23	June 30†
Admiralty, large	34s.@36s.	*30s.*
Steam smalls	25s.@26s.6d.	*23s.@24s.*
Newcastle:		
Best steams	26s.6d.	**26s.6d.@27s.**
Best gas	30s.	**30s.**
Best bunkers	26s.@30s.	**28s.@30s.**

† Advances over previous week shown in **heavy type**, declines in *italics*.

News Items From Field and Trade

ALABAMA

The DeBardeleben, Empire and Corona coal companies, three of the largest operating concerns in the state, **have been merged.** Henry T. DeBardeleben, president of the new company, announces the issuance of $4,000,000 first mortgage 6½ per cent gold bonds dated July 1, the proceeds of which will be applied to payment in part for the properties of the three companies absorbed. The new company represents an annual production of 2,000,000 tons and has valuable unopened seams.

The Imperial Coal & Coke Co., it is announced, will install a complete water works system at its Majestic Mines, in the northern part of Jefferson County, a reservoir or standpipe of 100,000 gallons capacity being provided, with the necessary water mains to cover the camp. Septic tanks or pit toilets also will be installed at all residences of employees at Bradford mines, as well as at Majestic mines, operated by the same interest and located near the Bradford pit.

The Galloway Coal Co. is constructing a brick commissary building and also a large warehouse at Carbon Hill, the location of extensive mining operations of the company, the improvements to cost around $50,000.

Incorporation papers have been taken out here by the **Consolidated Coal & Mining Co.,** with an authorized capital of $50,000, business to begin when $25,000 is paid in. Officers and incorporators of the new company, which will have offices at Birmingham, are: E. H. Douglass, Calexico, Calif., president; Torcuato Marcor, Chihuahua and Mexico City, Mex., vice-president, and J. J. Healey, Birmingham, secretary-treasurer. J. L. Croft and J. Hughes Croft, Gadsden, Ala., G. C. Healey and A. Eubank, Birmingham, are others interested in the organization.

The Pratt Fuel Company, with headquarters in Birmingham, has purchased the properties of the Dora Fuel Co. and the Kershaw Mining Co., at Dora, Walker County. The consideration is not given, but is said to be a large figure. The addition of these mines at Dora will give the Pratt Fuel Co. an output of 50,000 tons of coal per month. The announcement is made that Frank Marquis, who was president of the Dora company, and John Stone, of the Kershaw company, will be members of the Pratt Fuel Co., with Walter Moore as president. Mr. Moore also heads the Empire Coal Co., of Birmingham. Mr. Moore owned extensive mines near Dora previous to the purchase of these other mines. All of these mines will now be consolidated, under the head of the Pratt Fuel Co. Mr. Moore is said to be planning the erection of a big byproducts plant at Empire and other big enterprises. The mines at Dora have contracts on hand which will require at least one year of steady operation of the mines.

The Porter Coal Co., at Palos, of which Frank House is president, has increased its capital stock to $100,000, and has commenced operations at the old Porter mine, in Walker County, where the Big Seam or Mary Lee seam of coal is being worked.

ALASKA

By a proclamation issued by the President and made public June 26, **the Secretary of the Interior is authorized to operate the government railroad of Alaska,** including branch lines, feeders, and telegraph and telephone lines connected with it. Vestment of this authority was made necessary by the completion of the construction of the line last week when the last length of standard-gage track was laid into Fairbanks, thus finishing all the engineering work.

CALIFORNIA

James F. Calbreath, secretary of the American Mining Congress, was the guest of honor at a banquet in Los Angeles, June 7, at the University Club, under the joint auspices of the Chamber of Mines and Oil, the Los Angeles Stock Exchange, and the American Institute of Mining and the Metalurgical Engineers. He spoke on the mining industry. A. C. McLaughlin, president of the Chamber of Mines and Oil, presided.

COLORADO

It is confidently expected by some elements in the Colorado coal industry that the prospective building of **the Moffatt tunnel will open to northwestern Colorado a large trade in bunker coal on the Pacific coast.** Most bunker coal in American Pacific ports now comes from Australia and even Wales and sells often for as much as $30 a ton. It is calculated that Routt County coal could be sold at Seattle and San Francisco for half that. The case obstructing the progress of the tunnel project is now before the United States supreme court. It may be decided during June. If the decision is favorable, Colorado is free to sell tunnel bonds and soon thereafter begin construction.

Having completed his term as State Commissioner of Mines, **Horace F. Lunt has opened an office as consulting mining engineer** at 617 Majestic Building, Denver.

CONNECTICUT

The Connecticut Blower Corporation, Hartford, has been incorporated under the laws of Delaware with a capital of $250,000. M. E. Keeney, president; C. H. Keeney, treasurer; C. E. Keeney, secretary. The company has taken over the International Blower Co. and the Hartford Sheet Metal Works. The products manufactured and installed include blowers and exhaust fans, blower systems of all kinds, dust-collecting systems, exhaust systems, ventilating systems, etc. The plant of the International Blower Co. will be utilized until autumn, when a considerably larger plant will be occupied.

ILLINOIS

The Roanoke Brick Co., of Roanoke, **has purchased the plant of the Roanoke Coal Co.** and will operate the mine in the future. The mine now gives employment to 160 men and it is the intention of the new owners to develop the property.

W R. Trapper & Co., Inc., Fisher Building, Chicago, is a new organization with capital of $40,000. The incorporators are Sidney H. Ware, James Mayer and George Erickson. The company organizes to manufacture coke as well as mine coal and will deal in both coal and coke.

The Hi-Carbon Coal Co., Campbell Hill, has been incorporated with capital of $30,000 to deal in and operate coal, fluorspar and fireclay mines and gas and oil wells. It has been organized by E. B. Dick, Byrd Thimig, J. B.Gustat and A. C. Mitchell.

The Abbott Coal Co. has been organized at Pekin by Charles Abbott and associates. A new mine is to be opened on the Abbott land southeast of Pekin, near the location of the Hawlet coal mine.

The Riverton mine of the Peabody Coal Co., which has been closed since May 1 while a new shaker screen was being installed, resumed operations June 15. J. F. Monahan is the district manager.

The Rutland Third Vein Coal Co., of Rutland, has been incorporated with capital of $100,000 to operate the Rutland mine, which has been discarded for some months. J. L. Bane will be general manager of the company, and M. J. Proctor is the superintendent. J. L. Bane, F. W. Rohrer, F. W. Sauer and M. J. Proctor has been appointed a committee to purchase material for the new company. The steel tower which had settled 7 ft. at one corner since the mine closed down has been straightened. It is planned to resume operations by Aug. 15.

The Orton & Steinbrenner Co., 608 South Dearborn St., Chicago, manufacturers of locomotive cranes, dipper shovels and grab buckets, **announce a reorganization of the company** and the election of the following officers: P. A. Orton, president and general manager; E. B. Ayers, vice-president; Herbert Mertz, secretary and sales manager; Harry Shaffer, treasurer and purchasing agent; G. L. Niederst, chief engineer, and Alex. Orton, works manager. The reorganization is occasioned by the resignation of H. G. Steinbrenner as president and the disposal of his interest in the company.

Rumors that Williamson County Coal was pretty well mined out in the No. 6 seam resulted in an investigation which shows that while the west half of the county underlaid with seam No. 6 probably will be exhausted by the existing mines in the next 30 years, the eastern half is practically untouched except in the Pittsburg area. Some of the mines now working No. 6 contemplate in time working No. 5, which is from 60 to 100 ft. deeper. This is a thin seam, averaging 5 ft., but is of higher quality than No. 6. The Harrisburg seam is No. 5. Constant mining of this seam will take from 75 to 100 years to work out Williamson County.

Directors of the Sullivan Machinery Co., Chicago, have **declared a dividend of $1 a share,** payable July 16 to stockholders of record June 30, 1923.

INDIANA

The boiler room, the hoisting cable and machinery and other mining accessories of the **J. & M. Mine,** two miles southwest of Linton, Ind., were **destroyed by fire** recently, entailing a loss of about $10,000, closing the mine for an indefinite period until new construction is completed. The mine is owned by the High-Grade Coal Co. of Terre Haute, in which Clem and Frank Richards and John T. Beasley are chief stockholders.

The Pine Ridge Mines Co., of Terre Haute, has filed preliminary certificate of dissolution.

The Clinton Coal Co., of Clinton, has arranged with Roberts & Schaefer, of Chicago, to build a four-track steel tipple at Clinton.

The Penna mine, opened about three months ago by the Templeton Coal Co. near Hymera, on the C. M. & St. P. R.R., **is just getting into production.** It is expected to develop into one of the big producers of that region.

IOWA

The Electric Mining Co. is building a switch from the Burlington tracks near Cuba. The switch is about two miles long.

The Rasor Coal Co., of Tuscola, will erect a new office building.

KANSAS

A new steam shovel has been installed at the Moka pit near Mulberry by the Sheridan Coal Co. as a part of a program to increase tonnage.

KENTUCKY

The Consumers Red Ash Coal Co., of Pineville, capital $2,000, has been chartered by T. P. and R. A. Cairns and B. F. Johnson. **The Berger Coal Co.,** Harlan, has filed amended articles increasing its capital stock from $150,000 to $225,000.

Louisville retailers are watching with interest the erection of the **first slotype coal handling plant in Louisville,** this being erected by the Charles Buddeke Coal Co., at Logan and Breckinridge streets.

Fred J. Hinkebein after 14 years as secretary of the Atlas Coal Co., has resigned and gone with the Moll Wrecking Co., Louisville. He has been **succeeded by W. W. Dant,** formerly in the retail coal business and distillery business at Dant, near **Lebanon.**

The Louisville & Nashville R.R. is spending $8,734,403 in double tracking 89.61 miles of its divisions in the very heart of Kentucky's coal-producing regions in order to facilitate fuel shipments and relieve congestion.

The Elkhorn Star Coal Co., of Pikeville, has increased its capital stock from $125,000 to $175,000. New Kentucky incorporations are the **Castro Coal Co.,** of Pineville, capital $30,000, by W. M. Freeman, E. A. Smothers and C. L. Gooch; the Cumberland Straight Creek Coal Co., Pineville, capital $20,000, by Col. E. Shaffer, Eula Pursiful and H. J. Gibson.

The work of pouring concrete for the new tipple of Mine No. 1 of the Wasson Coal Co., Harrisburg, has started. The new tipple, which is being erected by the Jeffrey Mfg. Co., may be completed by Aug. 1.

The Old Ben Coal Corporation, one of the largest operating companies in southern Illinois, announces the opening of offices in the Central National Bank Building, St. Louis.

The two big issues that are being used **in the platforms of the various candidates for Governor of Kentucky** in the fall elections, in an effort to obtain the nomination, revolve around **race-track gambling and a tonnage tax on coal.** There may be some argument in favor of a tonnage tax, but there are many arguments against it. As a matter of fact a Governor has very little to say about the matter, as he can't make laws, and it is a question for the state Legislature to decide on either issue. However, it is certain that there will be a number of bills before the next Legislature on these two subjects.

Charles Geis, of Zanesville, Ohio, and Peter C. McKinney of Oakmont, Pa., holders of one-fifth of the $400,000 capital stock of the Rockport Coal Co., operating mines at Rockport and Centerstown, **have instituted suit in the federal court against the Crown Coal Co.,** H. L. Tucker, Mrs. Zetta Tucker, James Danks, John T. May, L. D. Smith and Rodney D. Reid, stockholders, asking the appointment of a receiver and an accounting of the business. The petition alleges that H. L. Tucker and his associates have voted excessive salaries to the present officers of the company; that they formed the company known as the Crown Coal Co. and that later they entered into a contract with this company, giving it the exclusive right to sell all coal produced or controlled by the Rockport Coal Co. on which sales a commission of 8 per cent was paid and that these commissions have exceeded $100,000. It is also alleged that Tucker and his associates have caused to be issued to them many shares of stock in the company for which no cash payment has been made.

The Kentucky & Indiana Terminal R.R. at Louisville has arranged to spend $1,500,000 for better terminal trackage at Louisville and has ordered a number of switch engines to take care of severe traffic congestion which has been experienced in Louisville over the past few months as a result of heavy traffic and shortage of facilities for handling it. The road operates a bridge across the Ohio River at Louisville and switches for the B. & O., Monon and Southern railroads.

The Southeast Coal Co., of Seco, suffered damage of $8,000 on June 9, when a large commissary store was burned. Part of the storehouse was saved.

Clifton Rodes, vice-president of the Pittsburgh Fuel Co., Louisville, lost by fire a home valued at $25,000 Saturday afternoon, June 9. The home is on the upper River Road, and while city equipment answered the alarm, there was no water available.

Officials of the Louisville & Nashville R.R., Louisville, as well as of the Interstate R.R., of Stonega, Va., have **denied** press reports from Whitesburg to the effect **that the L. & N. had obtained control of the Interstate,** which would give it a connection from Norton, Va., to the C. C. & O. R.R., which has recently been leased by the L. & N., giving the latter a connection from southeastern Kentucky to the Atlantic coast.

MINNESOTA

An estimate of the number of oil-burning plants in domestic establishments in the Twin Cities places the present number at around 1,000. These plants burn from 50 to 150 gallons of oil a week, during the cold weather, representing, according to the oil concerns, from one-third of a ton to a full ton of coal in heating value. This represents a considerable diversion of business heretofore going to domestic coal.

The find of supposedly anthracite coal at Benoit, near Crookston, proves to be a soft coal of apparently the same grade as that found in the railroad yards nearby.

Albert Lea, comes forward with a find of coal, pronounced by a local geologist as being of the grade **similar to that known as blacksmith's anthracite** and worthy of a further investigation.

MISSOURI

The case against Fred W. Kleine, of the former St. Clair Coal & Mining Co., by the St. Louis water works for fraud in short weighting, has been dismissed by the prosecuting attorney. The water works weighmaster and Edwin F. Kleine, who were sentenced to two years for prosecution in these frauds have appealed, but the evidence was such that the attorney felt that he could not get a conviction in the case of Fred W. Kleine.

J. W. Alder has leased 2,600 acres of coal land near Amorel on the Kansas City Southern R.R., and development work will start soon.

MONTANA

The Northern Pacific railroad is building a branch line from Forsythe, about 40 miles up Armell's Creek to Hobsonville, where more **lignite acreage is to be opened** and stripped with steam shovels.

NEW YORK

William E. Marks Coal Co., of Syracuse, was low bidder for 1,000 tons of buckwheat coal for use at the Onondaga Court House at the opening of bids on June 11. The company's bid was $5.94 for immediate delivery, but the price for an optional order for 1,000 tons for future delivery was placed at $6.19. E. J. Leonard bid $6.04 in both cases, and the C. L. Amos Coal Co., $6.15.

L. B. Foster Co., Inc., has moved its New York City offices into larger quarters on the 14th floor of the Tribune Building.

The Pennsylvania Coal & Coke Corporation reports a surplus of $79,707 after all charges for May, against a deficit of $91,473 last year. For the first five months of the year the surplus was $549,319, against a deficit of $48,296 in the same period last year.

OHIO

Papers have been filed with the Secretary of State **increasing the authorized capital of the Cambridge Stripping & Mining Co.,** Cambridge, from $5,000 to $20,000.

The Southern Ohio Coal Exchange reports that out of 445 mines reporting for the week of June 9, a total of 227,090 tons were produced, with a full-time capacity of 752,993 tons. Of the shortage of 525,903 tons, railroad disability or car shortage caused a loss of 59,387 tons; labor shortage, 19,406 tons; strikes, 5,010 tons; mine disability, 14,574 tons, and no market, 427,226 tons. In the eastern Ohio field during the same week 16,562 cars were ordered, of which 14,047 were placed and 11,274 were loaded. This was an 85 per cent car supply.

Suit for $150,000 damages has been filed in Common Pleas Court by the McIntire Coal & Builders' Supply Co., of Zanesville, against the Pennsylvania Railroad Co. and the Zanesville Terminal Railroad Co. for alleged failure to furnish shipping facilities to it at Zanesville since 1918. The coal company says, in the petition, it had an agreement with the Zanesville Terminal company for service over a belt line at Zanesville, and that when the short line was sold to the Pennsylvania Co., April 27, 1917, service was refused.

OKLAHOMA

The Gem Coal & Mining Co. is the firm name of a new coal mining concern just organized at Henryetta. The company is capitalized at $75,000 and announces that it will develop coal mines near Henryetta. The incorporators are Duncan McKay, Elizabeth McKay and J. E. Thompson, all of Henryetta.

The Chicago, Rock Island & Pacific Ry. will abandon its coal mines in Oklahoma and Arkansas and convert its locomotives to oil burners, according to announcement by Peter R. Stewart, Arkansas Commissioner for the Southwestern Interstate Coal Operators. Opinion among coal operators is that the railroads in changing from coal- to oil-burning locomotives and the use of fuel oil in many industrial plants has curtailed the consumption of coal in Oklahoma until the mine output will have to be restricted to prevent overproduction.

PENNSYLVANIA

J. O. Durkee, formerly with H. C. Frick and the Hillman Coal & Coke Co., has been **appointed chief mine inspector with the Bethlehem Mines Corp.**

The Suffolk Coal Co. has purchased 130 acres, including the Langcliffe colliery, in Avoca, from the New York & Pittston Coal Co. Title carries with it the coal in the mines and surface title. Practically all the stock of the New York & Pittston company was held by Pittston families. The consideration has not been made public. The new owners have carried on mining operations on the land for some time.

Since acquiring the mine of the H. D. W. Coal Co. in Preston County **the Preston Smokeless Coal Co.,** organized not long ago, has materially increased the capacity of the mine which is now producing at the rate of 450 tons a day insted of at the rate of 150 tons a day as was the case before the mine was sold. Among other improvements made has been the installation of cable haulage. This company is developing approximately 125 acres of Freeport coal. Ira L. Weaver and others of Fairmont are interested in the new concern.

The following coal companies were incorporated at the State Department, Harrisburg, recently: **Thompson Run Mining Co.,** Ellwood City, mining and preparing bituminous coal for the market; capital, $40,000; incorporators, Harry L. Clark, 216 Glenn avenue, Ellwood City, treasurer; Clyde Gibson, New Castle, and J. E. Drake, New Castle. **Universal Coal Co.,** Dravosburg, mining and quarrying coal and limestone; capital, $6,000; incorporators, Anastasia Bielski, Dravosburg, treasurer; Vincent Bielski and Alexander J. Bielski, Dravosburg. **Noel Coal Co.,** Uniontown; capital, $20,000; mining coal and manufacturing coke; incorporators, Dick Sherrick, Uniontown, treasurer; J. D. Sherrick, Connellsville, and Harry Strickler, Uniontown.

Since acquiring Mine No. 93 of the Consolidation Coal Co., the **Connellsville By-products Coal Co.,** owned by the J. A. Paisley interests, has been making a number of improvements, with a view to increasing the production of this plant. Sixteen feet are being removed from the bank at Murray in order to provide for side-track facilities. It is also understood that the company has under consideration the question of constructing a large steel tipple with a capacity of 450 tons an hour, which will make it possible to increase the daily production of the mine from 500 tons a day to about 3,500 tons a day.

It is estimated that within a period of six weeks up to and including May 25 there were produced **in northern West Virginia no less than 5,362,350 tons of coal,** the largest production during that period being in the week ending May 19, when the output reached a total of 664,500 tons. It has been possible to produce that large a tonnage notwithstanding the fact that about half the mines in the northern part of the state are idle. Approximately 275 are not in operation and about 290 are producing.

Chief Walsh of the State Department of Mines, who is anxious to reduce mining accidents and to keep the department in the front rank in maintaining a high standard of safety work, has completed arrangements to have **operators and miners in the anthracite region devote two weeks to a careful study of all phases of mining that have a bearing upon the safety and welfare of the employees.**

A deal was closed recently whereby J. H Weaver, of Philadelphia, became the owner of coal lands in Cambria County owned by Joseph and Michael Farren. The price was said to be $165 per acre and the total consideration was $85,000. The purchase also includes the Murry estate adjoining, of which Michael Farren is executor. The coal will be mined near Ebensburg.

The Superior Coal Co. has closed down indefinitely its mine at Superior, Fayette County.

E. A. Siemon, of California, Pa., general superintendent of the Diamond Coal & Coke Co., a subsidiary of the Hillman Coal & Coke Co., has been appointed assistant general superintendent of the latter company, in charge of several mines, including the mines of the former company and several others.

The State Department of Mines is unaffected by the new administrative code which is now being put into effect at Harrisburg. The code originally made the department a bureau of the Department of Labor and Industry, but opposition to this plan resulted in an amendment that kept the activities of the commonwealth relative to mining under a separate department.

A State charter was issued recently at the State Department, Harrisburg to the **Pilgram Coal Co.,** Pittsburgh, mining and preparing coal for the market. Capital, $5,000. Treasurer, J. D. C. Miller, 213 North Elizabeth Street, Hazelwood, Pittsburgh. Incorporators: C. F. Kiefer, Pittsburgh; J. D. C. Miller, and David E. Meigs, Swissvale.

What promises to be the largest coal-mining operation in the Myersdale district of Somerset County was launched recently when application was made to the Governor for **a charter for a corporation to be known as the Blue Lick Coal Co.** The projectors of the new company are Frederick Rowe, Frederick E. Rowe, Clarence F. Rowe and Clyde J. Rowe, all well-known coal operators in the Meyersdale field except Clyde J. Rowe,

who is operating at Wellersburg, Pa., and Mt. Savage, Md. The tract includes 1,300 acres and will be worked from a number of openings which will be connected with both the Baltimore & Ohio and the Western Maryland railroads by a broad-gage railroad four miles in length. It is thought the road will be finished in time to start three or four operations before cold weather sets in.

Russell A. Tippins has resigned as superintendent for the receivers of American No. 1 coke plant of the American Coke Corporation, at Linn, Fayette County. The duties of the position have been taken over by Gibson Hardy, of Orient, general superintendent of the American No. 1 and Orient plants of the company. The American No. 1 plant was closed down a few weeks ago and is now resuming operations again in full. The Orient plant has fired 80 more ovens and now has 250 out of a total of 480 in blast.

Officials of the United Mine Workers in the anthracite coal fields are reported to be **planning to organize the John Mitchell Life Insurance Co.**

Governor Pinchot has appointed T. Henry Walnut, of Philadelphia, as **chairman of the state workmen's compensation board.** Mr. Walnut, who is an attorney and former assistant United States district attorney, will take the place made vacant by Harry A. Mackey, who was appointed under the Brumbaugh administration.

Alex Campbell, of Pittston, general chairman of the Pennsylvania Coal Co. miners, has been **elected international board member** of the United Mine Workers, according to complete returns of the district election recently held. The contest between Campbell and Michael Kosik, of Dupont, was the only one not definitely settled early in the count. With the count completed, Rinaldo Cappelini's plurality over William J. Brennan for the district presidency is 9,530. Cappelini received 24,500 votes, while Brennan's total was 14,970.

Investigation of books and records of anthracite companies was ordered by Auditor General S. S. Lewis, **June 21,** as the result of discrepancies between market and reported value of anthracite. The aggregate of anthracite recorded for 1922 fell short of estimates, the Auditor General stated. Mr. Lewis intimated that charges in excess of 12½ per cent were being passed on to the consumer. "It is my desire not only to determine the aggregate value but as well to standardize methods of reporting and to bring the whole practice into conformity with the law," the Auditor General declared. H. J. Cassidy and N. Nester Grimm, special investigators of the department, will make a tour of the anthracite field and report to Mr. Lewis.

An opinion by Deputy Attorney General J. W. Brown to Joseph J. Walsh, chief of the State Department of Mines, holds that if bituminous coal miners are using cars which are not of uniform capacity and cars which are not branded they are violating the law. The opinion states that the act of June 1, 1883, P. L. 52, in Sec. 2, provides as follows: "That at every bituminous coal mine in this Commonwealth, where coal is mined by measurement, all cars, filled by miners or their laborers, shall be uniform in capacity at each mine; no unbranded car or cars shall enter the mine for a longer period than three months, without being branded by the mine inspector of the district, wherein the mine is situated; and any owner or owners, or their agents, violating the provisions of this section, shall be subject to a fine of not less than one dollar per car for each and every day as long as the car is not in conformity with this act, and the mine inspector of the district, where the mine is located, on receiving notice from the check-measurer or any five miners working in the mine, that a car or cars are not properly branded, or not uniform in capacity according to law, are used in the mine where he or they are employed, then inside of three days from the date of receiving said notice, it shall be his duty to enforce the provisions of this section, under penalty of ten dollars for each and every day he permits such car or cars to enter the mine: Provided, That nothing contained in this section shall be construed or applied to those mines who do not use more than ten cars."

UTAH

The United States Fuel Co. is making a new opening in Panther Canyon and **expects to be shipping coal from there soon.**

George W. Hahn, of the United States Fuel Co., has been appointed chairman of the entertainment committee for the convention of the Rocky Mountain Coal Mining Institute, to be held in Salt Lake City, Aug. 27 to 29, in conjunction with the international safety convention.

Two more miners have been convicted in connection with the killing of a deputy sheriff during the strike of last year. The cases were heard in Salt Lake City. The charge was reduced to manslaughter and the men were sentenced to one year in the state prison. Eleven more men are to be tried in connection with the same case.

Eli Taylor, of Salem, has been appointed to succeed Gould B. Blakely as **register of the Federal land office** in this state

The United States is trying to recover control of 1,600 acres of coal land in the Fish Lake National Forest in cancellation proceedings against eleven persons. All of the defendants had been granted permission to mine for coal, but the government claims that they did not intend, as the law requires, each to operate separately. **Also it** claims they have not done any work.

WEST VIRGINIA

Sixteen new companies were formed in West Virginia to engage in the coal business during April, including two non-resident corporations, with an aggregate capital stock of $2,011,000.

The New River Collieries Co., operating in the New River field of West Virginia, produced **a total of 600,000** tons during January, February, March and April. During the first four months of the year the New River company had declared $4.50 a share in dividends or $330,546 in all on its 73,477 shares of preferred stock.

The Realization Coal Co., of New York, has been incorporated by Charleston interests in West Virginia. It will have a general office at 2 Rector Street, New York and has an authorized capital stock of $150,000. The firm is empowered to operate coal mines in various counties of the state.

The Bethlehem Mines Corporation, of Philadelphia, is buying two Marcus screens to be installed in the company's new tipple at Richards.

The Farrell Fuel Co., which maintains offices in Philadelphia and Uniontown as well as Pittsburgh, Pa., announces the opening of a new office at Fairmont. James P. Burns, Jr., has been appointed manager.

Harrison County coal people have organized the **Cummings-Bowers Coal Co.,** with capital of $50,000, for the purpose of operating in Harrison County. The office of the company is to be at Clarksburg. Identified with the new concern are: A. H. Cummings, Calder A. Lyons, Stanley C. Morris, V. A. Miller, all of Clarksburg, and James H. Bowers, of Lumberport.

Operations on quite a large scale in the Logan field **are contemplated by the Dwyer Coal Co.,** the headquarters of which are at Chapmansville. The company has a total authorized capital stock of $100,000. The company was incorporated by John J. Dwyer, J. W. Dwyer, R. A. Dwyer, I. D. Dwyer and N. L. Ford, all of Lewisburg.

With a view to engaging in the coal business in the Monongalia field, **the High Quality Coal Co.** has been ushered into existence by Morgantown business men, this company having a capital stock of $100,000. Morgantown is to be the headquarters of the company. Incorporators of the new concern were B. M. Chaplin, O. K. Sauerwein, G. H. Saville, H. W. Hunt and T. M. Jones, all of Morgantown.

The Banks Supply Co., Huntington, dealers in mine, mill and factory supplies, having found it necessary to enlarge its plant the second time within two years, is about to build a two-story brick and steel building 50 by 90 ft. on the lot on Eleventh Street adjoining the present property. This building will be used as a showroom for mine and road machinery.

The old pump house at the mouth of Beaver Creek near Gage, **formerly used by the Davis Coal & Coke Co.** to supply water for its Weaver plant, **was burned down during the early part of June.** It had not been in operation for some time.

Since the price began to drop, **production of coke in northern West Virginia has begun to dwindle** and many ovens have been drawn. That has been the case on the Connellsville Division of the Baltimore & Ohio between Fairmont and Morgantown as well as in other sections of West Virginia. Coke manufacturers expect no immediate improvement in the coke situation in view of prevailing low prices.

The Scotts Run Railway Co. is the name of a company recently incorporated with a capital of $1,000,000, according to an announcement from Morgantown. The company intends to purchase the Morgantown & Wheeling Railroad Co. when it is placed on sale by trustees of the Monongahela County Circuit Court, July 6, to satisfy outstanding indebtedness, approximating $1,500,000, it was announced. The incorporators are: H. C. Nutt, Pittsburgh, president of the Monongahela Railroad Co.; Albert Ward, of Pittsburgh, counsel for that company, and Judge Frank Cox, George C. Baker and Stanley R. Cox, of Morgantown, local counsel for the company.

WASHINGTON

Burnett mine hoisted 900 tons of coal June 15, which surpassed all production records **for a single eight-hour shift in the history of the operation.**

WASHINGTON, D. C.

The U. S. Civil Service Commission announced an open competitive examination **for observer and computer in gas analyses** to fill a vacancy in the Bureau of Mines, at Pittsburgh, Pa., and vacancies in positions requiring similar qualifications, at entrance salaries ranging from $1,320 to $1,620 a year, plus the increase of $20 a month granted by Congress. The examination will be held throughout the country on Aug. 8. Full information and application blanks may be obtained from the U. S. Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examiners at the post office or custom house in any city.

CANADA

Profits of the Crows Nest Pass Coal Co., Ltd., for 1922 were $213,959, as compared with $411,170 for the previous year, being a decrease of nearly 48 per cent. This is attributed to the five months' strike resulting in a reduction of production from 774,847 tons of coal and 66,569 tons of coke in 1921 to 569,339 tons of coal and 46,368 tons of coke in 1922. After provision was made for depreciation and taxes the profit and loss account shows a debit balance of $94,874 as compared with a credit balance last year of $93,725.

The investigation into the charges brought by the striking miners against the Edmonton city police in connection with the strike at the Penn mine, on Jan. 4, ended by a finding that exonerates the police. The charges were that the police brutally clubbed women in dispersing the crowd, that the chief constable fired into the crowd, and that the chief constable was drunk. The last charge was withdrawn during the investigation when it was found that the chief constable was a total abstainer. Justice Walsh found that the police force was acting within its jurisdiction, that no unnecessary violence was used, and that if any injuries were received by the miners or their wives the blame could be placed only on themselves.

According to a report just issued by the Ontario fire marshal, E. P. Heaton, too many substitutes for anthracite have caused the great increase in the number of fires throughout Ontario of late.

The Toronto Board of Education has decided that the entire 17,000 tons of coal required for the current year for the schools of the city shall be **Pocahontas coal to be supplied by the Doan Coal Co.**

Profits of the Sterling Coal Co., Toronto, which operates mines in Ohio and West Virginia, for the year ending March 31, 1923, including dividends and earnings from investments, and after deducting operating expenses, cost of management, etc., **amounted to $121,945.68,** against $6,788.20 last year. The balance at credit of profit and loss now stands at $243,183 compared with $200,672 last year. Current assets stand at $313,004 and current liabilities at $252,850.

Association Activities

At an executive meeting of the new board of directors of the **National Coal Association** held just before adjournment of the annual convention at Atlantic City, M. L. Gould, president of the Linton Coal Co., of Indianapolis, Ind., was elected as director from Indiana. He succeeds A. M. Ogle, president of the Vandalia Coal Co., Terre Haute, Ind., who will serve as director ex-officio during the terms of his four successors in office as president of the National Coal Association.

Trade Literature

Electric Capstan Car Puller. Gifford-Wood Co., Hudson, N. Y. Bulletin No. 74. Four-page folder illustrating and describing how the machine locates cars to be loaded or unloaded.

Erie Lubricated Caterpillar Type Mounting. Erie Steam Shovel Co., Erie, Pa. Bulletin S-60. Pp. 20; 8x11 in.; illustrated. Among the advantages claimed are: The tread links are automatically oiled from internal reservoirs, the link pins have hardened renewable steel bushings, the steel treads are practically indestructible and it can be steered by power from the cab.

Novo Air Compressor Outfits, Type H. Novo Engine Co., Lansing, Mich. Bulletin 153. Pp. 11; 8x11 in.; illustrated. Describes short belt drive with floating idler pulley and independent cooling systems. The engine can be used as an independent power plant if desired.

A trolley folder recently issued by The Yale & Towne Mfg. Co., Stamford, Conn., illustrates and describes its plain and geared types of steel plate roller bearing trolleys, also its cast-iron trolley, with details of tests to which the latter was subjected.

American Air-Tight Doors. Conveyors Corporation of America, Chicago, Ill. Four-page folder describing this non-warping, cast-iron door, particularly applicable to ashpits, coke ovens, boiler settings, dryers, etc.

Mellin Belt Conveyor Idler. Chillingworth Engineering Corp., New York, N. Y. Bulletin No. 3 A. Four-page folder describing both the troughing and return idler.

Circle Showers. The American Hinge Co., St. Louis, Mo. Pp. 12, 5 x 7 in., illustrated. Different types of showers, water heaters, drinking fountains, etc., are described.

Publications Received

Your Telephone—The Voice of Your Business, by Pauline Dunstan Belden, Blodgett Press, St. Paul, Minn. Pp. 71; 4 x 6 in. This little book gives some useful information concerning the telephone, how it should be used, etc.

West Virginia Geological Survey of Morgantown, West Va., has just issued a detailed report on **Tucker County**, by David B. Reger. The book contains 542 pages and is illustrated with 16 half-tone plates and 11 zinc etchings. A separate case of topographic and geologic maps accompany the report.

Bibliography of Petroleum and Allied Substances in 1919 and 1920, by E. H. Burroughs. Bureau of Mines, Washington, D. C. Bulletin 216. Pp. 374; 6 x 9 in.

Explosives, Their Materials, Constitution and Analysis, by C. A. Taylor and Wm. H. Rinkenbach. Bureau of Mines, Washington, D. C. Bulletin 219. Pp. 188; 6 x 9 in.; illus. Explosives are grouped as dynamites, black powders, propellants, detonators and primers.

An Investigation of the Fatigue of Metals, by H. F. Moore and T. M. Jasper. A report of the investigation conducted by The Engineering Experiment Station, University of Illinois, in coöperation with The National Research Council, Engineering Foundation and The General Electric Company. Bulletin 136. Pp. 97; 6 x 9 in.; illustrated.

The Geology of the Mokau Subdivision, by J. Henderson and M. Ongley. Dept. of Mines, Geological Survey Branch, New Zealand. Bulletin No. 24. Pp. 83; 8 x 11 in.; illus.; maps and tables. Informs the reader that the coal measures of the Mokau and Waitewhena districts are found to be of younger age than the Waikato coal measures and gives analyses of coals found.

The Star, Johannesburg, South Africa, on March 14, 1923, published its special annual commercial and financial supplement. Information pertaining to coal is found on page 8, covering the export trade and byproducts.

Third Standardization Bulletin by the Standardization Division of the American Mining Congress. Pp. 387; 6 x 9 in.; illustrated. Proceedings of the third national standardization conference, held in connection with the 25th annual convention of the American Mining Congress at Cleveland, Ohio, Oct. 9-14, 1922.

American Railway Association. Program of the railroads to provide adequate transportation service in 1923. Pp. 12; 8 x 10 in. Statement and resolutions adopted at member meetings of the association held in New York City April 5, 1923, with chart traffic forecast for 1923.

The Black Hills Engineer, formerly the Pahasapa Quarterly, published by The South Dakota State School of Mines, Rapid City, S. D. The March issue is almost wholly devoted to the subject of lignite. Results of tests made at the Mining Experiment Station of the State School of Mines on North Dakota lignite are given, also costs.

The Universal and the Fireman's Gas Masks, by S. H. Katz, J. J. Bloomfield and A. C. Fieldner. Bureau of Mines, Washington, D. C. Technical paper 300. Pp. 22; 6 x 9 in.; illustrated.

The coal beds in an area of 462 square miles in Belmont, Monroe, Guernsey and Noble counties, Ohio, not far from Wheeling, W. Va., are described in a report by D. D. Condit, just published by the Geological Survey as its Bulletin 720, entitled **"Economic Geology of the Summerfield and Woodsfield Quadrangles, Ohio."** A precise knowledge of the thickness, extent and purity of the coal beds is given, as well as their geologic structure or slope, their location with respect to routes of transportation, and the composition and heating value of the coal in the minable beds. The bulletin not only indicates the areas in these quadrangles where the Pittsburgh and other well-known coal beds of the northern Appalachian field attain workable thickness but describes the geologic formations and states the resources of building stone, limestone, clay and shale, and underground water.

Owing to the popular interest in the nature and operations of the Industrial Court Law of Kansas an account of the law and its workings through the period that it has been in effect has been published by the U. S. Bureau of Labor Statistics as Bulletin No. 322. The report gives the text of the law, which was passed in 1920, a synopsis of the cases filed on the industrial side of the court during 1920 and 1921 showing the methods and principles adopted by the court in its various actions, and an account of the legal proceedings arising in connection with the attendance of witnesses before the court and other activities of the court. A résumé also is given of the annual reports which have been published and a bibliography of books and articles relating to the court is appended. The bulletin is based only on official data and presents no other viewpoint or comment than that of the body under consideration or of the courts discussing it.

The Mines Branch, government of the Province of Alberta, at Winnipeg, has issued a brochure entitled **"Coal Truths,"** which was prepared primarily for the use of the domestic user of Alberta coals, although it is also expected to prove of value to large purchasers of coal, engineers and firemen. The brochure is designed to bring about a better understanding of fuel with a view to greater economy in use. It is profusely illustrated. The text and illustrations of the publication were prepared by Geo. R. Pratt, A. M. E. I. C., fuel engineer, Province of Alberta, Winnipeg, Manitoba.

Fires in Steamship Bunker and Cargo Coal, by H. H. Stoek, Bureau of Mines, Washington, D. C. Technical paper 326. Pp. 51; 6 x 9 in.; illustrated. This report should be of value to steamship owners and to shippers and buyers of water-borne coal.

Increase of Population in the United States 1910-1920, by William S. Rossiter. Bureau of the Census, Washington, D. C. Pp. 255; 7 x 10 in.; tables, maps and charts. Study of changes in the population of divisions, states, counties, and rural and urban areas; also sex, color and nativity.

Year Book for 1917 and 1918, by Frank W. DeWolf, chief, State Geological Survey, Department of Registration and Education, Urbana, Ill. Bulletin No. 38. Pp. 474; 7x10 in.; illustrated, plates, map and tables. Contains administrative report and economic and geological papers.

Manual for Operators Under Oil and Gas Regulations, by S. E. Slipper, under the direction of O. S. Finnie, director of Northwest Territories and Yukon Branch, Department of the Interior, Ottawa, Canada. Pp. 73, 5x7 in., illustrated; with map showing natural gas resources.

"The Anthracite Strike of 1922," a 62-page pamphlet, has been issued by the Anthracite Bureau of Information, Philadelphia. The brochure is a chronology of the communications and negotiations between the anthracite operators and the United Mine Workers, including the producers' reply to the miners' demands and embodying a plan for averting future suspensions; also the arbitration proposal—an offer by the operators to refer issues in dispute to a presidential commission; the government's proposal, indorsed by the President and offered through Senators Pepper and Reed; also the agreement of Sept. 2, an extension of wage contract and working conditions to Aug. 31, 1923, pending investigation by the U. S. Coal Commission.

Electric Brass Furnace Practice, by H. W. Gillett and E. L. Mack. Bureau of Mines, Washington, D. C. Bulletin 202; 334 pp.; 6x9 in.; illustrated. Records progress so far made in melting brass electrically.

Specifications for Petroleum Products and Methods for Testing. Bureau of Mines, Washington, D. C. Technical paper 323; 88 pp.; 6x9 in.; illustrated. The specifications noted were officially adopted by the Federal Specifications Board for the use of the departments and independent establishments of the government in the purchase of materials covered by them.

Traffic News

During 1922 fifteen new coal mines were opened along the lines of the Norfolk & Western R.R., making 221 companies organized for producing coal and coke on the road, with a total of 328 separate mines, of which 324 were in actual operation, and 9,731 coke ovens of which 1,052 were in blast. The freight tonnage carried amounted to 37,357,078, an increase of 7,672,143 tons over 1921. Income from freight transportation showed an increase of $10,451,025.22 over the previous year, while the operating revenues were $90,314,742.34 and the operating expenses $67,977,201.90, leaving net operating revenues of $22,337,540.44. Fuel for yard locomotives for the year cost $600,379.45, a decrease of $323,997.40 when compared with 1921, and for train locomotives $5,999,127.79, a decrease of $1,771,686.60 for the same period. Fuel consumed by steam locomotives during the year was 2,758,804 net tons, an increase of 515,808 net tons over 1921. Among the securities owned by the railroad company are 9,994 shares out of 10,000 shares of capital stock of the Pocahontas Coal & Coke Co., which is valued at $999,400. The balance sheet of that company shows a deficit as of Dec. 31 of $2,037,198.63.

Coming Meetings

Oklahoma Coal Operators' Association will hold its annual meeting Sept. 13 at McAlester, Okla. Secretary, A. C. Casey, McAlester, Okla.

Rocky Mountain Coal Mining Institute will hold its summer meeting Aug. 27 to 29 at Salt Lake City, Utah, in conjunction with the **International Safety and First-Aid Meet.** Secretary, Benedict Shubart, Denver, Colo.

National Safety Council will hold its twelfth annual safety convention at the Buffalo Statler Hotel, Buffalo, N. Y., Oct. 1-5. Managing director and secretary, W. H. Cameron, 168 No. Michigan Ave., Chicago, Ill.

The American Institute of Mining and Metallurgical Engineers will hold its annual meeting in Canada. The meeting will start Aug. 20 at Toronto and end Aug. 30 at Montreal. Secretary F. F. Sharpless, 29 West 39th Street, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment**, Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Mine Inspectors' Institute of America will hold its 13th annual meeting July 10-12 at Pittsburg, Kan. Secretary, J. W. Paul, 4800 Forbes St., Pittsburgh, Pa.

New York State Coal Merchants' Association will hold its annual convention on Sept. 10-12 at Sacandaga Park, N. Y. Executive secretary, G. W. F. Woodside, 250 Arkay Building, Albany, N. Y.